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**OXFORD DOCTORAL COURSE IN CLINICAL  
PSYCHOLOGY**

***Factors associated with the presentation of persisting  
Post Traumatic Stress Disorder symptoms in people who have  
sustained traumatic spinal cord injuries***

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# ABSTRACT

## ***Objectives:***

This study aimed to investigate factors associated with persistent Post-Traumatic Stress Disorder (PTSD) in people with Spinal Cord Injury (SCI). In the context of a cognitive model, it sought to determine how influential cognitive appraisals were in predicting persistent PTSD when compared to other known predictor variables in the literature such as injury severity, gender, previous psychiatric history and social support.

## ***Design:***

A cross-sectional questionnaire survey that examined concurrent predictors of PTSD symptoms and diagnosis primarily using multiple regression analyses.

## ***Method:***

A sample of 50 inpatients receiving rehabilitation for SCI who were 3-24 months post- injury were interviewed using a series of standardised measures of PTSD symptoms and diagnosis, post-traumatic cognitive appraisals, social support, and injury severity.

## ***Results:***

For PTSD symptoms, significant relationships were found for greater injury severity, lower satisfaction with social support and more negative cognitions. PTSD diagnosis was only related to cognitive variables. Negative cognitions were found to predict variance in PTSD symptoms over and above the non-cognitive variables although gender and injury severity were also predictors. The only significant predictor of PTSD diagnosis was the cognitive sub-scale 'negative cognitions about the self'.

## ***Conclusions:***

Cognitive appraisals were found to be important predictors of persisting PTSD in an SCI population. This supports the cognitive model of PTSD and the development of cognitive therapies for PTSD in this population. Future research directions are discussed.

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The medical staff at the spinal unit in Stoke Mandeville Hospital

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M, D, N & R

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# 1. INTRODUCTION

## *1.1 Overview*

This study aims to investigate the factors associated with persisting Post Traumatic Stress Disorder (PTSD) symptoms in a sample of people who have sustained spinal cord injuries (SCI). In particular, it seeks to determine the influence of subjective cognitive appraisals of the trauma and its consequences in predicting persistent PTSD symptoms when compared to objective injury severity. The study also aimed to investigate whether factors consistently associated with PTSD such as female gender, previous psychiatric history and social support are relevant within this injured population and their influences in the prediction of persistent PTSD.

Few of these factors have been investigated in relation to PTSD in an SCI population. In particular the role of cognitions has not previously been ascertained in this context. Investigation of this would help to confirm whether or not the current dominance of cognitive treatment approaches is justified with traumatically injured people and would help to shape priorities for psychological assessment and treatment.

The introduction begins with an examination of PTSD in terms of the clinical context, diagnosis, differential diagnosis and co-morbidity. The prevalence of PTSD following trauma exposure is discussed and the natural course of the disorder described.

Psychological models of PTSD are then considered with an emphasis on cognitive models. Ehlers and Clark's (2000) recent cognitive model of persistent PTSD is discussed in detail with particular reference to their assertion regarding the key role of negative cognitive

appraisals in maintaining persistent PTSD. Studies that have tested this assertion empirically are then reviewed.

The empirical literature regarding other factors that influence the presentation of persistent PTSD is then examined with a focus on four main factors that have emerged as consistent predictors. These are gender, previous psychiatric history, social support and trauma severity.

The most salient predictor in the literature is ‘trauma severity’. The difficulties inherent in measuring trauma severity are discussed. Several studies have used ‘injury severity’ as an objective indicator of trauma severity. These studies are critically reviewed with particular reference to the measurement of injury severity. The present study attempts to improve on previous methodologies by examining injury severity more comprehensively. It is within this context that the rationale for selecting a sample of people with SCI is explained.

SCI is then introduced in terms of definition, aetiology and special issues related to measuring PTSD. Prevalence and risk factors for PTSD in this population are then reviewed. The rationale for the present study is then summarised and research questions and hypotheses stated.

## ***1.2 PTSD***

### ***1.2.1 The clinical context***

PTSD is a disabling psychological reaction that follows exposure to a ‘traumatic’ event. Although there are problems with how ‘trauma’ is defined, which is discussed in more detail later, an event can be considered ‘traumatic’ if it has involved actual or threatened harm,

helplessness or horror. Symptoms include a triad of intrusive re-experiencing of the trauma, avoidance of reminders of the event and increased physiological arousal.

PTSD can be a highly distressing condition, which can cause significant impairments to individuals' vocational and social functioning (Shalev, Bonne & Eth, 1996). It is frequently accompanied by other mental health problems such as depression and substance misuse, is associated with increased rates of physical health problems and often has a chronic course (Yule, William & Joseph, 1999).

PTSD can be particularly problematic in SCI populations where it can significantly interfere with rehabilitation and long-term management of, and adjustment to, physical disability (Williams, 1997). This is especially pertinent given that the circumstances in which SCIs often occur overlap with those where psychological trauma may occur and PTSD may be expected (Boyer, Tollen & Kafkalas, 1998).

### ***1.2.2 PTSD diagnosis***

The concept of trauma-related emotional disturbance has existed for over 100 years particularly in relation to the impact of war where it was variously termed 'traumatic neurosis' and 'shellshock' (Foa & Meadows, 1997). However, it has only recently been officially recognised as an anxiety disorder and termed PTSD in Diagnostic and Statistical Manual of Mental Disorders III (DSM-III, American Psychiatric Association-APA, 1980).

Since 1980, the criteria by which the disorder is defined have been revised both in DSM-III-R (APA, 1987) and most recently in DSM-IV (APA, 1994).

The current DSM-IV diagnostic criteria for PTSD are as follows:

*Criterion A:*

The person has been exposed to a traumatic event in which **both** the following were present:

- (1) The person experienced, witnessed or was confronted with an event/events that involved actual/ threatened death or serious injury, or a threat to the physical integrity of self or others.
- (2) The person's response involved fear, helplessness or horror.

*Criterion B:*

The traumatic event is persistently re-experienced in **one (or more)** of the following ways:

- (1) Recurrent and intrusive distressing recollections of the event, including images thoughts or perceptions.
- (2) Recurrent distressing dreams of the event.
- (3) Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations and dissociative flashback episodes, including those that occur on awakening or when intoxicated).
- (4) Intense psychological distress at exposure to internal or external cues that symbolise/ resemble an aspect of the traumatic event.
- (5) Physiological reactivity on exposure to internal or external cues that symbolise/ resemble an aspect of the traumatic event.

*Criterion C:*

Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by **three (or more)** of the following:

- (1) Efforts to avoid thoughts, feelings or conversations associated with the trauma.
- (2) Efforts to avoid activities, places or people that arouse recollections of the trauma.
- (3) Inability to recall an important aspect of the trauma.
- (4) Markedly diminished interest or participation in important activities.
- (5) Feeling of detachment or estrangement from others.
- (6) Restricted range of affect (e.g. unable to have loving feelings).
- (7) Sense of a foreshortened future (e.g. does not expect to have a career, marriage, children or a normal life-span).

*Criterion D:*

Persistent symptoms of increased arousal (not present before the trauma) as indicated by **two (or more)** of the following:

- (1) Difficulty falling asleep or staying asleep.
- (2) Irritability or outbursts of anger.
- (3) Difficulty concentrating.
- (4) Hypervigilance.
- (5) Exaggerated startle response.

*Criterion E:*

Duration of the disturbance (symptoms in criteria B, C and D) is **more than one month**.

### *Criterion F:*

The disturbance causes clinically significant distress or impairment in social, occupational or other important areas of functioning.

### *Specifications:*

- (1)    Chronicity:    Acute:           if duration of symptoms is less than three months  
                          **Chronic:**       if duration of symptoms is **three months or more**.
- (2)    Delayed Onset:       if onset of symptoms is at least six months after the stressor

This study focuses on DSM-IV diagnoses as these have been most widely used in PTSD research (e.g. Breslau, 1998 and Brewin, Andrews & Valentine, 2000).

### ***1.2.3 Differential diagnosis***

Jones and Barlow (1990) assert that PTSD is clearly differentiated from other anxiety disorders (with the possible exception of some simple phobias) because the anxiety is centred on cues associated with the original trauma. There is also a greater degree of dissociation present in severe cases of PTSD than in other anxiety disorders. Acute Stress Disorder (ASD) is symptomatically similar to PTSD but has additional dissociative symptoms required for diagnosis (e.g. depersonalisation and amnesia). It is also distinguished in relation to a shorter duration (2-4 weeks post-trauma). Adjustment disorders are characterised by an emotionally distressed state that disturbs social functioning and performance. They occur in response to a significant life change (e.g. SCI) and usually last less than a month (Kennedy & Duff, 2001).

### ***1.2.4 Co-morbidity***

People with PTSD often meet the criteria for at least one other psychiatric diagnosis. Brady (1997) and Kessler, Sonnega, Bromet, Hughes & Nelson (1995) found that 80% of people with PTSD meet the criteria for at least one other psychiatric disorder; most commonly depression, but sometimes panic disorder or substance misuse.

### ***1.2.5 Epidemiology: prevalence***

Many studies have provided estimates of PTSD prevalence by determining what proportion of people exposed to traumatic events go on to develop PTSD -termed the 'conditional risk' (Breslau, 1998). Conditional risk estimates vary widely according to whether clinical samples, specific-trauma epidemiological samples or population-based epidemiological samples are studied. The latter is perhaps the most useful as it avoids selection bias and generalisability problems associated with the others.

Breslau (1998), in a large review of epidemiological studies, found a conditional risk of 10-15% and concluded that, as a rule, those with PTSD do not exceed one quarter of those exposed to traumatic events. Green (1995), in another review, concluded an average conditional risk of 25% and warned that no absolute rates are available. Estimates depend on which diagnostic criteria are used (e.g. DSM-III-R had more stringent criteria regarding what constitutes a 'trauma' than DSM-IV), which types of traumas are examined and how frequently they occur in the population (Breslau, 1998). It is noteworthy that nearly all of the large epidemiological studies conducted in this area involved U.S. populations so questions about generalisability to U.K. populations remain.

### ***1.2.6 Course (persistence/chronicity)***

Up to 60% of those exposed to a traumatic event experience at least some symptoms of PTSD in the immediate aftermath (Helzer, Robins & McEvoy, 1987). While a considerable proportion recover, a significant sub-group, (about 30%), continues to suffer persisting symptoms (Breslau, 1998). Ehlers and Clark (2000) assert that it is largely this group that seeks treatment. Several studies have found that PTSD can persist without treatment. A large epidemiological survey found a median remission rate of three years for those who sought professional help and five years for those who did not (Kessler et al., 1995). Simon (1999) notes that people with chronic PTSD have more severe symptoms, more life disruption and more co-morbid mental health problems on average than those with acute PTSD. For these reasons, the present study focuses on chronic PTSD.

## ***1.3 Theoretical context***

### ***1.3.1 Psychological Models of PTSD***

Several psychological theories have been put forward to explain the development and persistence of PTSD, including psychodynamic (e.g. Freud, 1919) and learning theories (e.g. Keane, Zimmering & Caddell, 1985). Foa, Steketee & Rothbaum (1989) assert that cognitive theories, in comparison, are able to explain more PTSD symptoms. Brewin, Dalgleish and Joseph (1996) and Power and Dalgleish (1997) argue that cognitive theories are the most fully developed and offer the greatest predictive power. In terms of efficacious therapies for PTSD, In terms of efficacious therapies for PTSD, Foa and Meadows (1997) conclude from their review that, overall, cognitive behavioural treatments have been subject to the greatest number of controlled outcome studies and have been the most rigorously tested. However, a closer examination of the evidence reveals that individual cognitive or behavioural procedures (for example, prolonged exposure procedures and stress inoculation training) have been



shown to be more effective in isolation than when combined. The use of combined approaches instead of individual approaches is therefore not currently supported by the literature. Cognitive models of PTSD are focused on here.

Cognitive models include those based on information-processing theories (e.g. Horowitz, 1973 and Foa, et al., 1989) and those focusing on cognitive appraisals (e.g. Janoff-Bulman, 1992). Several theorists have attempted to integrate the two (e.g. Foa & Riggs, 1993 and Brewin et al., 1996). Ehlers and Clark (2000) have recently proposed a cognitive model which, while drawing on the models cited above, focuses on explaining persistent PTSD. As such it was chosen to form the theoretical basis of the present study and is described in more detail here (see appendix 1 for diagrammatic representation).

### ***1.3.2 Ehlers and Clark's (2000) Cognitive Model of persisting PTSD***

This model postulates that PTSD becomes persistent when individuals process the trauma in a way that leads to a sense of serious current threat. The sense of threat arises as a consequence of two mechanisms that differ across individuals:

1. Excessively negative appraisals of the trauma and/or its sequelae
2. A disturbance of autobiographical memory.

Ehlers and Clark (2000) assert that a reciprocal relationship exists between the nature of the trauma memory and the appraisals of the trauma and its sequelae. They argue that in chronic PTSD, recall is biased by appraisals whereby information consistent with appraisals is selectively retrieved. Contradictory information is not recalled, therefore preventing change in appraisals. Inability to remember fully can then also be appraised in a way that maintains current threat e.g. "it means there's something seriously wrong with me".

Ehlers and Clark argue that because appraisals (both of the trauma and its sequelae) foster a sense of continued current threat (accompanied by intrusions, symptoms of arousal and other distressing emotional responses), the individual is motivated to engage in cognitive and behavioural strategies to reduce perceived threat and distress. Such strategies include avoidance and safety behaviours, which, while reducing distress in the short-term, maintain the disorder in the long-term by preventing cognitive change.

The model suggests that negative appraisals are one of two key components responsible for producing a sense of current threat and motivating strategies that prevent cognitive change. The second is disturbance of autobiographical memory, which is not examined in this study. This study focuses on the role of negative appraisals in persistent PTSD.

#### *1.3.2.1 Negative appraisals*

Ehlers and Clark (2000) suggest two main types of negative appraisals can produce a sense of current threat that leads to and maintains PTSD. Firstly, there are negative appraisals of the traumatic event, which can arise in several ways. They can arise, firstly, from over-generalisations from the event to perceiving a range of normal activities as more dangerous than they really are (e.g. avoidance of driving after a car accident). Secondly, from exaggerations of the probability of occurrence of further catastrophe in general and thirdly, from interpretations of the occurrence of the event happening to them and not to others (e.g. “bad things always happen to me”).

Secondly, there are negative appraisals of trauma sequelae. These include the person’s interpretation of their initial PTSD symptoms (e.g. “my reactions since the event mean I am going crazy”) and their interpretations of other people’s reactions (e.g. “I cannot rely on other

people”). These also include appraisal of the physical consequences that the trauma has had in other life domains (e.g. physical consequences such as pain or occupational consequences interpreted as “my life has permanently changed for the worse”).

### ***1.3.2.2 The relationship between appraisals and emotion***

Ehlers and Clark (2000) assert that the primary emotional responses in PTSD arise from particular negative appraisals. For example, appraisals concerning perceived danger (e.g. “nowhere is safe”) lead to fear and appraisals concerning unfairness (e.g. “others have not treated me fairly”) lead to anger. Appraisals regarding personal responsibility for the traumatic event and its outcome (e.g. “it was my fault”) lead to guilt and appraisals concerning perceived loss (e.g. “my life will never be the same again”) lead to sadness.

### ***1.3.3 Evidence for the role of negative appraisals in persistent PTSD***

The important role of negative appraisals in the maintenance of persistent PTSD is strengthened by empirical evidence of the role of dysfunctional cognitions in chronic PTSD (e.g. Foa & Riggs, 1993 and Ehlers & Steil, 1995). The key cognitive themes highlighted in the literature are outlined here and will be examined in the present study.

Firstly, there are negative cognitions about the self. These include negative appraisals of initial symptoms (e.g. “my reactions since the event mean I am going crazy”), of emotional reactions as frightening or uncontrollable (e.g. “I won’t be able to control my anger and will do something terrible”) and perceptions of permanent change (e.g. “my life has been destroyed by the trauma”). Several studies have found relationships between negative cognitions about the self and chronic PTSD (Foa & Riggs, 1993; Ehlers & Steil, 1995 and Davis, Brickman & Baker, 1991).

Secondly, negative global beliefs relating to the world (e.g. “the world is a dangerous place”) and people (e.g. “I cannot rely on other people”) have been highlighted in several studies (Janoff-Bulman, 1992 and Dunmore, Clark & Ehlers, 1999).

Thirdly, there are self-blame cognitions, which include negative appraisals of behaviour during the trauma (e.g. “the event happened because of the way I acted”). Several researchers have found self-blame cognitions to be associated with greater PTSD (Frazier & Schauben, 1994 and Joseph et al., 1993).

A measure has recently been designed to access such trauma-related negative cognitive appraisals, The Posttraumatic Cognitions Inventory (Foa, Ehlers, Clark, Tolin & Orsillo, 1999). It will be used in the present study and is described in more detail in the method.

Pertinent to the current study, several authors have found that cognitive appraisals predict equal or more of the variance in PTSD than trauma severity variables. For example, Dunmore et al., (1999) found that relationships between cognitive variables and PTSD remained significant when variations in perceived and objective assault severity were statistically controlled. Both Ehlers, Mayou and Bryant, (1998) and Steil & Ehlers (2000) found cognitions explained variance in PTSD symptom related distress that could not be explained by accident severity. Smith (personal communication, 2002) found cognitive factors predicted PTSD longitudinally over and above trauma severity variables (e.g. injury severity).

#### ***1.3.4 Summary***

Cognitive models currently dominate psychological understandings of PTSD and there is a growing body of evidence supporting the role of negative appraisals in persistent PTSD. It is therefore pertinent to determine how well cognitive appraisals predict chronic PTSD when

compared with other known predictors gleaned from the empirical literature. The wider empirical literature pertaining to risk factors for chronic PTSD is reviewed next.

## ***1.4 Empirical literature review***

### ***1.4.1 Factors influencing the presentation of chronic PTSD***

There is a large and diverse literature on factors that have been found to be associated with increased risk of developing chronic PTSD. The most salient factors will be reviewed here. These can be broadly categorised into demographic factors (e.g. gender) psychosocial factors (e.g. previous psychiatric history and social support) and factors related to the trauma (e.g. trauma type and severity).

#### ***1.4.1.1 Demographic factors***

Gender has consistently been related to the risk of PTSD with women being more likely to develop PTSD following trauma exposure. General population studies have repeatedly found that the conditional risk for women is approximately twice that of men (e.g. Breslau, 1998 and Norris, 1992). Breslau and Davis (1992) found that women were nearly four times as likely as men to develop chronic PTSD. Breslau, Davis, Andreski, Peterson & Schultz (1997) argue that these figures are confounded by trauma type and exposure frequency as women are more frequently exposed to assaultive violence (e.g. sexual assaults-both in childhood and adulthood) which carry the highest PTSD rates. However, Brewin et al., (2000) controlled for this in their meta-analysis and found the gender effect remained. They suggest that the gender effect may be a function of other characteristic differences between men and women such as levels of symptom reporting (women being more willing to report than men).

#### ***1.4.1.2 Psychosocial factors***

Brewin et al., (2000) found the most predictive factors in their meta-analysis were psychosocial such as previous psychiatric history, and lack of social support.

##### ***Previous psychiatric history***

Previous psychiatric history (particularly pre-existing major depression and anxiety, substance misuse and personality disorder) has been consistently associated with chronic PTSD in a number of studies (Breslau, 1998, March, 1993 & Green, 1995).

##### ***Social support***

Social support has been shown to be an important buffer to symptom severity in a range of anxiety disorders (Jones & Barlow, 1990). Several studies with combat veterans (e.g. Stretch, Vail & Maloney, 1985) and people exposed to other traumatic experiences (e.g. Wirtz & Harrell, 1987) have found social support to be negatively related to the development and maintenance of PTSD. Brewin et al., (2000), in their meta-analysis, found that lack of social support during or after the trauma was a significant predictor of PTSD.

#### ***1.4.1.3 Trauma factors***

##### ***Type***

Epidemiological findings on trauma type suggest that assaultive violence (e.g. sexual assault) confers the greatest risk for PTSD with prevalence rates reported at between 49% (Breslau, 1998) and 80% (Green, 1995). Road traffic accidents (RTAs), are thought to have a particularly adverse combination of frequency and impact (Kennedy & Duff, 2001). Prevalence rates vary widely between 23% (Mayou, Black & Bryant, 2000) and 40% (Blaszczynski et al., 1998). This is pertinent to the present study given approximately 50% of people with SCI sustain it through a RTA.

### Severity

Trauma severity (also called stressor severity and severity criterion A) has been considered by many studies as the most influential predictor of PTSD (Breslau, 1998 and Green, 1995). March (1993) reviewed 19 studies that quantified 'stressor intensity' suffered during combat, disaster, illness, injury and crime and found evidence in 16 of them of a 'dose-response relationship' whereby high stressor intensity was associated with higher PTSD rates. Green (1995) asserts that most studies of Vietnam War veterans have found level of exposure (to combat and abusive violence) to be associated with higher rates of PTSD but warn that combat findings need to be considered cautiously as they are often confounded by the effects of repeated exposure.

It is important to note trauma severity is not a sufficient explanation for the development or maintenance of PTSD. A clear conclusion from the epidemiological literature is that not everyone develops PTSD in response to severe stressors, in fact the majority of those exposed to traumatic events do not (March, 1993). Furthermore, no study has yet identified a threshold effect of trauma severity- it is a continuum where PTSD symptoms have been found in those who have experienced negative life events that do not meet criterion A (Green, 1995). In addition, the evidence discussed earlier of the role of cognitions in predicting as much or more variance in PTSD as trauma severity variables point to an interactive model where a range of factors inter-relate to increase the risk of PTSD (Brewin et al., 2000).

#### ***1.4.2 Summary***

The empirical literature appears to consist of two strands of evidence. On the one hand, there is considerable evidence to explain PTSD in psychiatric terms. When PTSD is conceptualised as a psychiatric disorder affecting a minority of individuals exposed to trauma, it shares risk

factors with many other psychiatric disorders. These include a greater prevalence in women, those with a prior psychiatric history and in those with poor social support. This explanation emphasises the importance of the subjective meaning the trauma has for individuals. The cognitive model, as discussed earlier, is built on this premise. However, one of the most consistent influential predictors of PTSD is 'trauma severity', which supports a 'dose-response relationship'.

The relative importance of trauma severity and individual factors in the aetiology of PTSD is still very much in debate (Brewin et al., 2000). Consequently, the present study was interested in discovering the comparative level of influence exerted by trauma severity variables and individual variables in predicting chronic PTSD in a population where trauma severity is objectively significant. In terms of individual variables, the study will examine gender, previous psychiatric history, social support and cognitive appraisals. The measurement of trauma severity will be discussed in the next section.

## ***1.5 Measuring trauma severity, physical injury and rationale for an SCI population***

### ***1.5.1 Measuring trauma severity***

There has been little consistency in the measurement of 'trauma severity' across studies so it is difficult to summarise. Some studies have measured trauma severity in terms of subjective impact (e.g. Radnitz et al., 1998). March (1993) asserts that subjective measurement is problematic because of retrospective reporting which is vulnerable to recall bias (those with more severe PTSD symptoms may retrospectively recall greater trauma severity). It can therefore erroneously inflate trauma severity and its relationship with PTSD (Brewin et al., 2000).



The present study sought to measure trauma severity objectively. Green (1995) and Simon (1999) listed the main objective indices that have been used in previous research as life threat; physical injury; violent loss or seeing someone killed. One of the most commonly used objective indicators of trauma severity in the literature is physical injury (Simon, 1999). Additionally, it is the only objective index of those listed above that can be graded according to severity. As such, it was used as an indicator of trauma severity in the present study.

### ***1.5.2 Occurrence of physical injury***

Radnitz et al., (1998) described the occurrence of an injury during the trauma as a reliable determinant of PTSD. Several studies on Vietnam veterans support this assertion. For example, Kulka et al., (1988) found that the PTSD rate was higher in injured veterans (31%) than in non-injured veterans (11%) and Helzer et al., (1987) obtained similar results. A criticism of these studies is that injury is confounded with combat so unique injury effects are difficult to partial out. However, findings in civilian samples are similar. Bownes, O’Gorman and Sayers (1991) found differences according to injury in rape victims, 72% of those who developed PTSD were injured during the rape compared to 40% of those without PTSD. These studies have been criticised for failing to measure injury severity (Blanchard et al., 1995).

### ***1.5.3 Injury Severity***

Several studies have reported a relationship between injury severity and the persistence of PTSD. Four RTA studies conducted by the Blanchard and Hickling group (Blanchard et al., 1995, Blanchard et al., 1996, 1996a and Blanchard et al., 1997) found a link between injury severity and PTSD, particularly at 12 months post-trauma rather than at shorter intervals.

Jeavons (2000) found injury severity was more predictive at 12 months than at 3 months. A similar pattern has been found with burns patients (e.g. Roca et al., 1992).

However, several studies have found no relationship between injury severity and PTSD (Blanchard et al., 1994 and Epstein, 1993). Green (1995) asserts that studies of accidental injury show that objective injury severity is not as important as perceived loss of function. Jeavons (2000) hypothesises that differing results in the literature may depend on the length of time post-trauma, with disability becoming more important longer-term. Mayou Bryant & Duthie (1993) and Blanchard et al., (1997) found that continuing medical problems were correlated with persistent PTSD. Blanchard and colleagues suggest that longer-term serious injury and resultant disability serve as a constant reminder of the trauma.

Ehlers et al., (1998) measured both injury severity and persistent medical problems in a consecutive series of RTA sufferers attending hospital and found that while persistent medical problems predicted PTSD at both 3 months and 1 year, injury severity did not. They concluded that persistent physical consequences (disability) are more important than original injury severity. They suggest that, although the mechanisms are unclear, it may be the fact that disability serves as a continual reminder, which makes it more difficult to put the trauma in the past. Disability may represent a chronic stressor that exceeds the person's coping resources and therefore makes it more difficult to overcome the trauma. Indeed, Ehlers and Clark (2000) assert in their cognitive model that traumas that leave the person with permanent disabilities are more likely to lead to negative appraisals such as "my life is ruined" than traumas that inflict temporary injuries.

Given these findings, it seemed important in the present study to obtain measures both of injury severity and disability, similarly to Ehlers et al., (1998).

### *1.5.3.1 Measuring Injury Severity*

Studies have varied in the measures used to quantify injury severity. The Abbreviated Injury Scale (AIS- American Association for Automotive Medicine, 1985) has been used by several studies (e.g. Blanchard et al., 1997). It requires the sum of ratings of the worst injury to seven body parts on a 5-point scale from 0 (not injured at all) to 5 (life-threatening injury).

Although the AIS has been shown to predict survival fairly well (Blanchard et al., 1995), it appears to only look at pathology and does not account for functional impact of injury –in terms of impairment and disability. For example, a person with a spinal injury may have a severe injury to one body part –the spine- but may have several resultant impairments to functioning of other parts such as the limbs and bladder. These are not taken into account with the AIS but certainly affect the severity of the physical consequences of the trauma. Ehlers et al., (1998) assert that they did not use the AIS because it would not give ‘clinically meaningful’ information.

Instead they used a measure that differentiated between soft tissue and bone injuries. Jeavons (2000) used doctors’ ratings, loss of consciousness and hospital triage ratings to determine injury severity. A difficulty with these measures lies in accurately determining injury severity over a diverse range of injury types. For example, a serious burn injury is arguably more severe than a broken arm-but this may not have been detected using Ehlers et al.’s measure. The indirect nature of Jeavons’ measures may also have been prone to inaccuracies.

The present study sought to investigate a population of injury sufferers who sustained similar injuries that could be systematically and objectively graded for severity and disability. Two types of injury fulfilled these criteria: head injury (HI) and SCI. The present study focused on

SCI because of several difficulties inherent in determining PTSD in HI populations. These include the fact that post-concussional symptoms overlap with PTSD symptoms, difficulties differentiating post-traumatic amnesia from post-traumatic dissociation and the fact there is controversy regarding whether PTSD can occur at all following prolonged unconsciousness (Mayou, Black & Bryant, 2000). Additionally people with HI may have cognitive difficulties that compromise their ability to partake in the study. However, SCI and HI are not mutually exclusive- some people with SCI will also have sustained a HI. The present study included only those with unconsciousness of less than 15 minutes. Mayou et al., (2000) suggested this cut off for mild HI which is less likely to be confounded by the factors described above. They found PTSD rates in those with mild HI to be comparable to those without HI.

#### ***1.5.4 Summary***

In measuring trauma severity, subjective measures are prone to inaccuracies so the present study measured trauma severity objectively. One of the few objective indexes of trauma severity, which can be graded, is physical injury. Previous injury research suggests that there are differences in the influence of injury severity in predicting PTSD depending on whether immediate impairment severity or longer-term disability severity is examined. It was therefore deemed important in the present study to measure both. The spinal cord injured population is one group where people sustain similar injuries that can be easily graded in terms of both impairment and disability severity.

### ***1.6 Spinal Cord Injury (SCI)***

SCI is one of the most serious physical injuries that can be sustained and so, according to Kennedy & Evans (2001), PTSD can be expected to be a common sequelae.

It occurs when the spinal cord is damaged in a manner resulting in permanent loss of neurological function below the level of the injury. The injury 'level' is denoted with a letter and number code as follows. Injuries to the neck (cervical injuries –levels: C1-C8) result in tetraplegia (quadriplegia), -paralysis of all four limbs. Injuries to the upper middle and lower back (thoracic-levels: T1-T12, lumbar-levels: L1-L5 and sacral-levels: S1-S5, respectively) result in paraplegia -paralysis of the lower limbs and sparing of the arms (see appendix 2 for illustrative diagram). Paralysis is accompanied by loss of sensory function which includes the sense of touch/pressure, temperature and pain (Kennedy, 1991). Injuries can be 'complete' or 'incomplete'. 'Complete' is a neurological term denoting a complete absence of sensory and motor function below the injury level whereas 'incomplete' denotes the retention of some functioning below the injury level (Waters, Adkins & Yakura, 1991). The majority of spinal cord injuries also involve losses in bladder, bowel and sexual function. The average period of hospitalisation for people with paraplegia is 4-6months and with tetraplegia, 6-12months. Generally, those with tetraplegia are unable to live independently on discharge (Kennedy, 1989).

### ***1.6.1 Epidemiology of SCI***

There are approximately 40,000 people with traumatic<sup>1</sup> SCI in the UK. The male to female ratio is 3:1. Almost 70% are under 34 years old when injured (Kennedy, 1991).

Of UK injuries, 50% are caused by RTAs, 25% by falls, 20% through sporting injuries and 5% from other causes (Kennedy & Evans, 2001). Kennedy & Evans assert that, despite the heterogeneity in causes of SCI, most events in which SCI is sustained could meet both aspects of criterion A of DSM-IV in terms of firstly, causing actual physical harm and secondly being responded to with 'fear, helplessness and horror'.

### ***1.6.2 Differences between a SCI population and other injury populations***

The extent and amount of individual adaptation required following SCI render it different from other physical injuries examined in PTSD research. The greater severity of SCI and the need for rehabilitation is likely to influence the expression of trauma compared to other injured populations (Kennedy & Evans, 2001).

The SCI population is also different in that the damage to the spinal cord may itself be a part of the trauma. Both Radnitz et al., (1995) and Boyer et al., (1998) emphasise that SCI is a multi-faceted trauma. For example trauma could be caused by the event, feeling the injury occur, immediate awareness of loss of sensation and movement and realisation of permanent physical changes. It could also be a function of other physical and psychological sequelae which follow-such as loss of sexual functioning, body image, secondary life-threatening complications and stress associated with life-long management.

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<sup>1</sup> In the term 'traumatic SCI', the word 'traumatic' is used as a medical descriptor to differentiate external causes of SCI from those that are the result of a disease process or a surgical procedure. It is different from the psychological use of the term- such as in the DSM-IV criterion A (see page 4).

Boyer et al, (1998) point to the dilemma this raises in PTSD research in this group. In terms of determining 'criterion A' to diagnose PTSD, studies could either focus solely on the event causing the trauma or address the entire experience of the event, injury and subsequent losses.

Although Boyer and colleagues used the second methodology for a comprehensive examination of post-SCI psychopathology, the present study used the first in order to adhere rigorously to DSM-IV criteria for PTSD in terms of linking symptoms to one traumatic event.

However, the author acknowledges that, in using self-report PTSD measures, some reported symptoms will be influenced by the wider experience of the injury and subsequent losses for individuals particularly for general questions (e.g. those regarding irritability, Radnitz, Schlein & Hsu, 2000).

### ***1.6.3 SCI and PTSD***

#### ***Prevalence***

Much of the PTSD research in SCI has been done with war veteran populations where the impact of prior combat-trauma remains a potential confounding variable. Radnitz et al., (1995), found a PTSD prevalence of 12-17% in veterans with SCI. The aetiology of SCI in their veteran sample was similar to the general population (with only 8% sustaining their injury through combat). Kennedy & Evans (2001), in a sample of SCI rehabilitation inpatients, found 20% of the sample had clinically significant PostTraumatic Stress (PTS) symptomatology. In a sample of young SCI rehabilitation inpatients (aged 9-22), Boyer et al., (1998) found a PTSD prevalence rate of 33%. These findings indicate PTSD rates in people who have sustained traumatic SCI are comparable to those of other trauma-populations and to the general population conditional risk.

### Risk factors

In terms of demographics, PTSD studies in SCI populations have produced mixed findings for gender. Kennedy & Evans (2001) found females had higher PTS symptom scores than males whereas Boyer et al., (1998) found no differences according to gender for PTSD diagnosis. It is noteworthy that only these two studies examined gender. Several papers used all-male samples (e.g. Radnitz et al., 1995).

Radnitz et al., (1998) examined trauma-related PTSD risk factors in veterans with SCI and found differences according to level of injury where veterans with paraplegia were counter-intuitively found to have a higher PTSD rate than those with tetraplegia. To further investigate this finding, Radnitz et al., (1998a) compared veterans with paraplegia and tetraplegia with veteran controls who had been injured but without SCI. They found similar PTSD rates in those with paraplegia (22%) and controls (21%) but only 2% in those with tetraplegia.

Binks, Radnitz, Moran and Vinciguerra (1997) offered an explanation for this finding in terms of the important role of peripheral nervous system functioning in the manifestation of the psycho-physiological symptoms of PTSD. In tetraplegia, the nerve fibres responsible for sympathetic nervous system arousal are damaged. This is consistent with the finding that memory for emotional events is modulated by peripheral nervous system activity (Cahill, Prins, Weber & McGaugh, 1994).

In contrast, Boyer et al., (1998) found no differences between people with paraplegia and tetraplegia on PTSD diagnosis but did find that people with tetraplegia showed increased PTS symptoms. They suggested that the relationship between level of injury and PTS symptoms might vary according to different sample populations. Kennedy and Evans (2001) found no



effect of injury level but that those with ‘complete’ injuries (more severe) had greater PTS symptoms than those with ‘incomplete’ injuries. Contrary to general physical injury research, Kennedy and Evans found no effect of disability severity on PTS symptoms.

In terms of psychosocial variables, as far as the author is aware, no studies examining PTSD in SCI populations have examined previous psychiatric history. Social support has been investigated generally in SCI populations and found to have an attenuating effect on both adverse physical and mental health outcomes (e.g. Kennedy & Rogers, 2000). However, the relationship between PTSD and social support in SCI population has only been examined in one study. Danner & Radnitz (2000) found that perceived social support predicted lower PTSD rates.

#### ***1.6.4 Summary***

Although SCI is one of the severest injuries that can be sustained, the PTSD rates are comparable to those of other trauma populations. Findings on injury severity (level) and demographics are more mixed than with other injured populations. This may be partly due to the relatively small number of studies in the area. Only one study has examined social support in relation to PTSD and none have looked at previous psychiatric history or cognitions. The present study aimed to investigate these factors.

### ***1.7 Rationale, Research Question and Hypotheses***

#### ***1.7.1 Rationale***

The present study aims to look at predictors of persistent PTSD in an SCI population. Given the current dominance of the cognitive model in terms of understanding and treating PTSD and the increasing importance of negative cognitive appraisals in predicting persistent PTSD,

it seemed pertinent to determine how well cognitive factors predict PTSD in populations where other variables are likely to be pertinent.

For the SCI sample, trauma severity (as indexed by injury and disability severity in the present study) is hypothesised to be important. The general literature suggests a positive relationship between trauma severity and PTSD. The injury severity literature is more mixed, although this may be a function of chronicity of injury where more consistent relationships are observed between disability severity and PTSD persistence. The SCI literature is conflicting; with some studies showing negative relationships and others showing positive relationships to PTSD. Given this unclear picture, an association between injury severity and PTSD was hypothesised but no effect direction specified.

Other variables that have repeatedly been shown to predict chronic PTSD include gender, previous psychiatric history and social support. The general PTSD literature suggests a consistent positive association between female gender and PTSD. The SCI literature only consists of two studies, one finding a positive female gender effect and the other finding no effect. Taking the literature as a whole, a positive relationship between female gender and PTSD was hypothesised. A positive relationship between previous psychiatric history and PTSD was hypothesised on the basis of this finding in the general PTSD literature as this has not yet been examined in SCI populations. A negative relationship between social support and PTSD was hypothesised to follow the findings of the general PTSD and SCI literatures.

In line with research that has found cognitions to predict PTSD variance when non-cognitive variables are controlled (e.g. Dunmore et al., 1999), the present study predicts that cognitions will be positively associated with PTS symptoms. Furthermore, it hypothesises that cognitive

factors will predict variance in PTS symptoms and PTSD diagnosis over and above that accounted for by injury severity, gender, previous psychiatric history or social support.

### ***1.7.2 Research Question***

Do negative cognitive appraisals of the trauma and its sequelae predict unique variance in PTS symptoms and PTSD diagnosis in an SCI population after important predictor variables in the empirical literature including trauma severity (as indexed by injury and disability severity), gender, previous psychiatric history and social support, have been accounted for?

### ***1.7.3 Hypotheses***

- 1
  - a) Injury severity will be associated with PTS symptoms.
  - b) Injury severity will be associated with PTSD diagnosis.
  
- 2
  - a) Female gender will be **positively** associated with PTS symptoms.
  - b) Female gender will be **positively** associated with PTSD diagnosis.
  
2.
  - a) Pre-morbid psychiatric history will be **positively** associated with PTS symptoms.
  - b) Pre-morbid psychiatric history will be **positively** associated with PTSD diagnosis.
  
4.
  - a) Social support will be **negatively** associated with PTS symptoms
  - b) Social support will be **negatively** associated with PTSD diagnosis
  
- 5
  - a) Negative appraisals will be **positively** associated with PTS symptoms

- b) Negative appraisals will be **positively** associated with PTSD diagnosis
- 6.
- a) Negative appraisals will explain unique variance in PTS symptoms over and above that contributed by injury severity, gender, previous psychiatric history and social support.
  - b) Negative appraisals will explain unique variance in PTSD diagnosis over and above that contributed by injury severity, gender, previous psychiatric history and social support.

### **3. METHOD**

#### ***2.1 Determination of sample size***

In order to accurately determine the sample size needed to test the hypotheses, a formal statistical power analysis would need to be conducted. However, this was not done because currently there are no directly comparable studies conducted with SCI populations as far as the author is aware. An examination of related studies that examine similar research questions with different populations (that is comparing the relative influence of demographic, trauma-related and cognitive variables on PTSD symptoms - Dunmore et al., 1999 and Regina & Steil, 2000) revealed that 50 participants would be adequate to test the hypotheses. Additionally, a sample size of 50 was also considered adequate to use linear regression analysis given the number of independent variables (Tabachnick & Fidell, 2001).

#### ***2.2 Participants***

Fifty people who were inpatients receiving rehabilitation at the National Spinal Injuries Centre (NSIC) between October 2001 and May 2002 were recruited where they met the inclusion criteria. The NSIC admits people who have sustained spinal injuries of any severity for rehabilitation. This was not a consecutive sample but rather one taken on the basis of availability and willingness of the participants to participate during the time period specified. It was therefore subject to sampling biases arising from researcher availability and participant self-selection.

### ***2.2.1 Inclusion criteria***

- Aged 18-65.
- 3-24 months post-injury (this time-period allowed participants to qualify for 'chronic PTSD' where they met diagnostic criteria).
- Experienced a traumatic onset SCI (e.g. from a fall or accident rather than surgery or illness -this distinction has been made in previous research and would increase comparability).
- Newly injured (i.e. not readmitted, for example, for complications from the injury- to control for the effects of community experience).

### ***2.2.2 Exclusion criteria***

- Where patients sustained a moderate-severe HI at the time of SCI (moderate/severe HI would be a potential confound). Presence of HI was determined by its documentation in medical notes. Where HI was not documented, the patient was excluded if he/she reported unconsciousness for >15 minutes at the time of the injury. This cut off was used in previous research to distinguish minor from moderate HI (Mayou et al., 2000 and Ehlers et al., 1998).
- Where ward staff deemed patients too physically unwell to participate.
- Where ward staff deemed patients unable to understand English well enough to complete the questionnaires.
- Where ward staff decided patients had cognitive disabilities that would have prevented independent completion of the questionnaires (this does not apply to those needing physical help).

## **2.3 Design**

A single group survey design using standardised questionnaire measures was used. It was cross-sectional, examining concurrent predictors of PTSD symptomatology. The central research question was investigated using multiple regression analyses.

## **2.4 Measures**

In order to maximise reliability and validity, the author selected measures that have, where possible, been used in previous research and have well-established psychometric properties.

### **2.4.1 Short demographics questionnaire**

Single item self-report questions were used to obtain information on age, gender, cause of injury, period of unconsciousness and previous contact with a psychologist or psychiatrist (see appendix 3).

### **2.4.2 Medical notes**

Information obtained from medical notes included: date of injury, whether a HI was sustained during injury, the 'level' of injury and whether it was 'complete' or 'incomplete'. Generally complete injuries, which occur at higher levels of the spinal cord, result in more impairment. The determination of whether the injury was complete or incomplete was combined with the injury level to provide an objective indication of the impairment severity, described next.

### **2.4.3 Injury Severity (as indexed by impairment and disability severity)**

#### **a) Impairment Severity: objective measure**

Impairment severity (considering completeness and level) was determined using an adaptation of the Frankel Classification (Frankel et al., 1969-see appendix 4) devised by Kennedy & Rogers (2000). They developed a five-point scale which groups levels of injury according to clinically and functionally significant boundaries as follows:

Incomplete injuries (Frankel-grades D and E) scored zero, while complete injuries (Frankel-grades A, B and C) were rated as follows:

C1 to C4	= 5
C5 to C7	= 4
C8 to T7	= 3
T8 to T12	= 2
L1 and below	= 1

Higher scores indicate greater impairment. This scale has been widely used in research in this area (e.g. Kennedy et al., 2000; Kennedy & Rogers, 2000).

#### **b) Disability Severity: Functional Independence Measure (FIM- Hamilton & Granger, 1990)**

The FIM (see appendix 5) was used to measure disability severity. It quantifies extent of disability by assessing individuals' physical and cognitive functioning levels. It is an 18-item self-report measure assessing six areas of function: self-care, sphincter-control, mobility, locomotion, communication and social cognition. Each item is evaluated on a 7-point scale with 7 being 'complete independence' and 1 being 'total assistance required', yielding a total score ranging between 18 and 126.



The FIM has been widely used in SCI research (e.g. Kennedy et al., 2000) and has been standardised and found to be internally consistent (Stinemen et al., 1996) with good reliability (Segal, Ditunno & Stass, 1993) and validity (Grey & Kennedy, 1993).

#### ***2.4.4 The Posttraumatic Diagnostic Scale (PDS – Foa, 1995)***

The PDS is a 49-item self-report measure designed to diagnose PTSD (see appendix 6). The structure and content map on to the DSM-IV diagnostic criteria.

The questionnaire has 4 parts. Part 1 includes a 14-item checklist of traumatic events and four ‘yes/no’ questions regarding responses to the traumatic event (e.g. helplessness or fear). This determines whether or not the participant fulfils ‘criterion A’ regarding trauma exposure. Part 2 assesses ‘criterion E’ which requires the trauma to be more than one month ago. Part 3 includes 17-items covering the three symptom clusters of DSM-IV, criteria B (re-experiencing), C (avoidance) and D (arousal). Participants are asked to rate how often they experience each symptom. Participants need to endorse at least one of five re-experiencing, three of seven avoidance and three of five arousal items to meet criteria B, C and D respectively. Part 4 assesses ‘criterion F’ with nine questions about how symptoms interfere with social and occupational functioning. Participants need to endorse at least two to meet criterion F. A PTSD diagnosis can be made if all six DSM IV criteria are met (A-F).

After consultation with two SCI inpatients regarding a pilot questionnaire, the nine questions about impairment in social and occupational functioning were altered to make them appropriate for the SCI inpatient population. They were collapsed into three areas: 1) work/rehabilitation progress, 2) social life/leisure activities and 3) family life and home responsibilities. Examples given to participants were tailored to inpatient-life (e.g. regarding

work, they were asked to consider rehabilitation progress and regarding family life and home, they were asked to consider family relationships and domestic rehabilitation tasks rather than domestic responsibilities outside the hospital. The criterion F requirement of two endorsed categories was retained even though this may have made the diagnosis more stringent.

The PDS has been validated with a large sample (n=264) of male and female victims of a wide range of traumas (e.g. accidents, assaults and fires) and is a recognised diagnostic tool for PTSD (Foa, Cashman, Jaycox & Perry, 1997). It has also been used with SCI samples (Boyer, et al., 1998).

The PDS demonstrates high internal consistency, good test re-test reliability and high sensitivity and specificity (Foa et al., 1997). In terms of validity, the PDS shares good diagnostic agreement with the Structured Clinical Interview for DSM (SCID: Spitzer, Williams & Gibbon, 1987).

#### ***2.4.5 The Impact of Events Scale (IES –Horowitz, Wilner & Alvarez, 1979)***

The IES is a 15-item self-report measure of subjective distress related to two characteristic aspects of post-traumatic psychopathology (see appendix 7). These are ‘intrusion’ (intrusively experienced ideas, images, feelings or dreams) and ‘avoidance’ (consciously recognised avoidance of intrusive phenomena).

Respondents rate the frequency with which they have experienced each ‘symptom’ (Not at all=0, Rarely=1, Sometimes=3, Often=5) over the past week. Intrusion (7-items; range=0-35) and avoidance (8-items; range=0-40) are sub-scaled separately. Together, the two scales give a total impact of event score (range=0-75).

The IES is not suitable for diagnosing PTSD- being a descriptive rather than diagnostic tool (Joseph, 2000). It is, however, the most widely used self-report measure of PTSD symptoms, both clinically and in trauma-research (Jeavons, 2000) and has been used with SCI populations (e.g. Radnitz et al., 1998).

It has been used as an analogue to diagnostic tests (Blaszczynski, et al., 1998), and is highly significantly correlated with PTSD severity (Radnitz, et al., 1998). It has been found to discriminate well between individuals who are not being treated but have experienced similar levels of objective trauma (Horowitz et al., 1979). Both sub-scales have been shown to have high test-retest reliabilities and high internal consistency (Zilberg, Weiss & Horowitz, 1982).

#### ***2.4.6 The Hospital Anxiety and Depression Scale (HADS- Zigmond & Snaith, 1983)***

The HADS is a 14-item questionnaire that was developed specifically for use with hospitalised populations where physical illness may inflate scores on traditional measures of anxiety and depression. It excludes most somatic symptoms (see appendix 8).

It has two sub-scales that are scored separately- anxiety (7-items) and depression (7-items). Each item is scored from 0-3 and for each sub-scale, total scores range from 0-21. On each sub-scale, scores of 8-10 are taken to indicate possible clinical disorder, whilst scores of 11 and above are taken to indicate probable clinical disorder. In the present study scores of 8 or above were taken to indicate clinically significant symptomatology as suggested by Weinman, Wright and Johnson, (1995).

The HADS is a brief, widely used measure with good concurrent validity (Zigmond & Snaith, 1983) and internal consistency (Moorley et al., 1991).

#### ***2.4.7 The Short Form Social Support Questionnaire (SSQ6- Sarason, Shearin, Pierce & Sarason, 1987a)***

The SSQ6 is a 6-item version (see appendix 9) of the original 27-item Social Support Questionnaire (Sarason, Levine, Basham & Sarason, 1983). The SSQ6 yields two measures of social support- one is a quasi-structural measure (number of supports) that provides information on the amount of support available. Participants list between 0-9 people known to them who provide the particular type of support listed in each question. Total scores range between 0-54. The other measure is a global functional measure (satisfaction with support) that measures satisfaction with the support. For each question, participants rate their satisfaction with the identified type of support on a scale from 1 (very dissatisfied) to 6 (very satisfied). Total scores range between 6-36.

There are no norms for the SSQ6 so it is not possible to identify whether individual scores reflect high or low levels of support or satisfaction. The scores therefore provide relative measures.

Both the number and the satisfaction sub-scales show high internal consistency and high test re-test reliability (Sarason et al., 1987a). Sarason et al., 1983 & Sarason, Sarason, Shearin & Pierce, 1987b) report considerable evidence for the validity and sensitivity of the original scale and Sarason et al., (1987a) report the SSQ6 has similar properties.

#### ***2.4.8 The Posttraumatic Cognitions Inventory (PTCI- Foa et al., 1999)***

The PTCI is a 33-item measure of trauma-related thoughts and beliefs (see appendix 10). It has been derived from clinical observations and current theories of post-trauma psychopathology, in particular Ehlers and Clark's (2000) cognitive model of PTSD.

The PTCI specifies 3 sub-scales of negative appraisals:

1. Negative appraisals about the self (21-items, range=21-147)
2. Negative appraisals about the world (7-items, range=7-49)
3. Self-blame (5-items, range=5-35)

Participants are required to rate their strength of agreement with each statement (e.g. “I can’t stop bad things happening to me”) on a 7-point scale ranging from 1 (totally disagree) to 7 (totally agree).

The mean score for each of the 3 sub-scales is summed to give a total score (range=33-231).

The author is unaware of any normative severity cut-offs for this measure.

In their validation study of this measure, Foa et al., (1999) found the PTCI to have a stable factor structure. They tested it on 3 samples and found items to have high loadings on the factor to which they were assigned and few showed substantial correlations on other factors. Factor congruence coefficient values indicated that the factors replicated well (negative cognitions about the self, negative cognitions about the world and self-blame were  $r=0.98$ ,  $r=0.99$  and  $r=0.99$  respectively). High internal consistency was demonstrated (total score,  $\alpha=0.97$ ; negative cognitions about the self,  $\alpha=0.97$ ; negative cognitions about the world,  $\alpha=0.88$ ; and self-blame,  $\alpha=0.86$ ). Test re-test reliabilities were calculated with Spearman Rho correlations both at 1-week and 3-week intervals on the total score and separately for each sub-scale (correlations ranged from  $r=0.74$  to  $r=0.89$ ).

In terms of convergent validity, the PTCI showed high correlations with other traumatic beliefs measures. For example, the PTCI 'negative cognitions about the self' scale showed high correlations ( $r=0.85$ ) with the 'self' scale of the Personal Beliefs and Reactions Scale (PBRs, Resick, Schnicke and Markway, 1991).

Foa et al., (1999) also examined the hypothesised relationships between cognitions and post-traumatic psychopathology with Spearman correlations between the PTCI and the PDS, Beck Depression Inventory (BDI-Beck, Ward, Mendelsohn, Mock & Erbaugh, 1961) and State-Trait Anxiety Inventory Form Y (STAI-Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). All PTCI scales strongly predicted PTSD severity (PDS,  $r=0.79$ ), depression (BDI,  $r=0.75$ ) and general anxiety (STAI state,  $r=0.70$  and trait,  $r=0.75$ ).

In terms of criterion-related validity, Foa et al., (1999) compared 3 groups; traumatised individuals with PTSD, traumatised individuals without PTSD and non-traumatised individuals. They found the PTCI discriminated well with the traumatised group with PTSD scoring significantly higher on the PTCI than either of the other groups, which did not differ from one another. The PTCI remained significant when age, sex, race, trauma-type, depression and anxiety were controlled for. The PTCI also demonstrated good sensitivity ( $r=0.78$ ) and good specificity ( $r=0.93$ ).

## **2.5 Procedure**

### **2.5.1 Ethical Approval**

Following preliminary discussions, the medical and surgical consultants at the NSIC agreed to support this research. Ethical approval was then sought from the local research ethics committee and, following minor amendments<sup>2</sup>, was granted (see appendix 11).

### **2.5.2 Liaison with medical staff**

Following individual meetings with the nursing sisters on 5 spinal wards in which they were given a summary of the research, they agreed to provide lists of those patients on their wards who met the study criteria. They provided detailed reasons for any patient they deemed unsuitable to participate.

Individual meetings with the responsible medical and surgical consultants were arranged. They were provided with a summary of the research and the sisters' lists were discussed. They ticked boxes next to individual patient names to indicate their consent for the patient to be approached to participate. Again, where they deemed particular patients unsuitable, they provided detailed reasons for their decisions.

This process was repeated as new patients were admitted until 50 participants were recruited.

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<sup>2</sup> *An amendment was made to the information sheet involving a rewording to offer participants the help of a clinical psychologist who was not involved in the research, should they request it. Additionally, approval was given on the condition that the responsible medical clinicians were to give individual consent rather than block consent for their patients to be recruited.*

### ***2.5.3 Participant consent and recruitment***

Individual patients were approached on the wards. They were given a verbal introduction to the researcher and study and provided with an information sheet (see appendix 12). If the patient was willing, the researcher returned at an agreed time at least 24 hours after the initial meeting to receive their decision about whether or not they wished to participate. Patients who were unwilling were thanked for their time and reminded that their decision would not affect their treatment in any way.

Those who agreed to participate were then met at an agreed time in a private room off the ward. They were given a consent form (see appendix 13) followed by the questionnaires, administered in an interview format to standardise the administration for participants with paraplegia and tetraplegia. Participants were offered the choice to have a copy of the research results sent to them upon completion of the study.

### ***2.5.4 Ethical considerations***

#### ***Consent***

The study was introduced thoroughly using both verbal and written information. The researcher ensured that there were many opportunities to ask questions about the study and that participants had time to consider it before making any decisions. A contact number was provided so the researcher could be contacted to answer any further questions. For those who agreed to participate, the researcher emphasised they were free to decline to participate at any stage without explanation and that this would not affect their treatment in any way.



### Confidentiality

All participants were seen in a private room. Questionnaires were given a code number so they remained anonymous. The confidentiality and anonymity of the study was emphasised to participants both verbally and reinforced on the information sheet.

### Distress

The researcher was aware of the possible burden of completing this research for individuals with busy rehabilitation schedules and physical difficulties. Consequently, one of the criteria for selection of measures was that they were as brief as possible. The questionnaires took between 20-40 minutes to complete. The researcher was also aware that discussing the injury and what caused it might be distressing for participants so they were not required to give detail or relive it. The content of the information sheet on contacting a clinical psychologist should they wish to was reiterated verbally to participants before the questionnaires were administered.

### 3. RESULTS

After a brief outline of the data analysis, the characteristics of the sample are described. Hypotheses 1 to 5 are then investigated and these findings summarised in a table. Hypothesis 6 is then investigated. The findings of the study are then summarised as a whole.

#### *3.1 Data analysis*

Data analyses were performed using SPSS. The characteristics of the sample including response rate, demographic, injury, psychosocial variables and prevalence of PTSD were examined using descriptive statistics. Sample characteristics were compared with Kennedy & Evans (2001), where comparative data were available, in order to determine the similarity of the present sample to other SCI samples. Their study was chosen as it most closely resembles the present study in terms of client group and methodology –it was the only other civilian, in-patient all-adult sample that was also mixed gender. Where possible, statistical comparisons were made between the two samples.

The hypotheses were investigated in turn using a range of parametric and non-parametric tests. Where necessary assumptions were met, as recommended by Tabachnick & Fidell (2001), parametric tests were used. Where data violated assumptions, non-parametric tests were used. Where current evidence suggested a directional prediction could be made, one-tailed tests were used. Where no directional prediction could be made, two-tailed tests were conducted.

Hypotheses that sought to determine the size of relationship between two variables and contained all continuous data (1a, 4a and 5a) were investigated using correlation coefficients.

Hypotheses examining differences between two groups and which contained both continuous and categorical data (1b, 2a, 3a, 4b and 5b) were investigated using parametric independent samples t-tests where assumptions were met and non-parametric Mann-Whitney tests where assumptions were not met. Hypotheses examining associations between two variables containing all categorical data (2b and 3b) were analysed using chi-square tests of association and, where the assumptions were not met, Fisher's Exact Probability tests. Hypothesis 6a, which sought to determine which variables best predicted PTS symptoms, was investigated using linear regression analysis. Following regression, the standardised residuals were checked for normality using one-sample Kolomogorov-Smirnov tests and for equality of variance using scatterplots. Hypothesis 6b, that sought to determine which variables best predicted PTSD diagnosis, was investigated using binary logistic regression analysis.

### ***3.2 Characteristics of the sample***

Sample recruitment, demographic, injury and psychosocial variables are discussed below. Means and inter-quartile ranges are provided in appendix 14.

#### ***3.2.1 Sample size and response rate***

Fifty participants who fulfilled the inclusion criteria were included in the study. A further 12 in the potential sample pool were excluded for the following reasons. Three declined to participate and nine met the exclusion criteria (four had unconsciousness of more than 15 minutes at the time of injury; two spoke no English and two were outside the age range - aged 16 and 79). Participants and non-participants were compared on demographic characteristics (age and gender) and several injury characteristics (injury level, completeness of injury and severity of impairment). No significant differences were found between them on any of these characteristics (see appendix 15).

### ***3.2.2 Demographic characteristics***

Of the 50 participants, 43 (86.0%) were men and 7 (14.0%) women. The mean age of participants was 38.9 years (SD= 13.42, range= 20.1-65.1 years). These demographics were similar to Kennedy & Evans' (2001) sample, which was 80.0% male with a mean age of 32.6 years.

### ***3.2.3 Injury characteristics***

In terms of cause of injury, 25 (50.0%) sustained their injuries in a RTA, 13 (26.0%) through sporting accidents, 10 (20.0%) through falls and 2 (4.0%) through other causes (one suicide attempt and one through gunshot). Kennedy & Evans (2001) again had comparable figures (RTA, 44.6%; sporting accidents, 30.1%; falls, 20.5% and other, 4.8%).

In terms of time since injury<sup>3</sup>, 30 (60.0%) participants were injured between 3-6 months ago, 9 (18.0%) between 6-9 months, 7 (14.0%) between 9-12 months, 1 (2.0%) between 18-21 months and 3 (6.0%) between 21-24 months.

In terms of injury completeness, 34 (68.0%) participants had complete injuries and 16 (32.0%), incomplete injuries. This is similar to Kennedy & Evans' sample where 70.0% had complete injuries.

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<sup>3</sup> Note the range of time since injury was restricted by the inclusion criteria, which stipulated that participants must be 3-24 months post-injury.

*Injury severity*

In terms of injury level, 30 (60%) had tetraplegia and 20 (40%) had paraplegia. Kennedy and Evans had a higher proportion of paraplegia (60%). Table 1 below shows the spread of injuries as categorised by the impairment severity measure.

**Table 1: *Distribution of Impairment Severity Scores***

Impairment severity category	Score	Frequency	Percentage
C1 to C4	(5)	8	16
C5 to C7	(4)	17	34
C8 to T7	(3)	9	18
T8 to T12	(2)	8	16
L1 and below	(1)	3	6
Frankel Grades D and E	(0)	5	10
<b>Total</b>		<b>50</b>	<b>100</b>

*Disability severity*

For the FIM, the mean score was 81.34 (SD=26.92, range=41-126). Note higher FIM scores denote greater disability. The means are similar in Kennedy & Evans (2001) sample where the mean was 73.27 (SD=25.45). A one-sample t-test revealed no significant differences between the two samples ( $t(133) = -0.21, p > 0.5$ ).

*Loss of consciousness*

In terms of ‘loss of consciousness’<sup>4</sup>, 31 (62%) reported never having lost consciousness at the time of their injury, 8 (16%) reported having been unconscious for <5 minutes and 11 (22%) reported being unconscious for 5-15 minutes.

<sup>4</sup> Note ‘loss of consciousness’ was restricted by the inclusion criteria to periods <15 minutes. Those unconsciousness for >15 minutes were excluded.

### ***3.2.4 PTSD symptoms and diagnosis***

#### ***PTSD diagnosis***

Twelve participants (24%) met the diagnostic criteria for PTSD and 38 (76%) did not.

#### ***PTS symptoms***

For the total IES score, the mean was 15.00 (SD=15.12, range=0-57). For the intrusion sub-scale, the mean was 6.92 (SD=6.90, range=0-23) and for the avoidance sub-scale, the mean was 8.08 (SD=8.99, range=0-36). Kennedy & Evans' (2001) sample had a total IES score mean of 21.41 (SD=16.49), an intrusion mean of 10.53 (SD=9.1) and an avoidance mean of 10.88 (SD=9.48). Although these means were slightly higher than the means of the present sample, a one sample t-test revealed that there were no statistically significant differences between them (IES total mean,  $t(133) = .264$ ,  $p > 0.5$ ).

### ***3.2.5 Anxiety and Depression***

#### ***Current anxiety and depression***

Levels of current anxiety and depression in the sample were as follows.

The mean score for anxiety was 6.48 (SD=3.69, range=0-14). In terms of clinical significance, 32 (64%) participants were in the normal range (scores of 7 or less) and 18 (36%) were in the possible clinical range (scores of 8 or more).

The mean depression score was 5.70 (SD=4.01, range=0-15). In terms of clinical significance, 34 (68%) participants were in the normal range (scores of 7 or less); 16 (32%) were in the possible clinical range (scores of 8 or more).

These percentages are similar to Kennedy & Evans (2001) who found that 35.3% of their sample were in the clinical range for anxiety and 31.8% were in the clinical range for depression. These comparisons should be considered with caution because Kennedy & Evans used different measures: the STAI for anxiety (Speilberger et al., 1987) and BDI for depression, (Beck et al., 1961).

Co-morbidity of anxiety and depression with PTSD diagnosis

Co-morbidity figures for anxiety and depression with PTSD diagnosis can be seen in Tables 2 and 3. The tables show that higher percentages of participants with PTSD diagnoses than those without scored in the clinical range for anxiety (66% of those with PTSD and 26.3% of those without) and for depression (66.7% of those with PTSD and 21.1% of those without). To investigate whether these differences were significant, a Fisher’s Exact Probability test was used. Significant relationships were found between PTSD diagnosis and both anxiety ( $p=.015$ ) and depression ( $p=.006$ ).

**Table 2: Co-morbidity of HADS anxiety with PTSD diagnosis**

PTSD Diagnosis	Normal (0-7)		Clinical range (8+)		Total
	Count	Percentage	Count	Percentage	
No	28	73.7	10	26.3	38 (100%)
Yes	4	33.3	8	66.7	100
Total	32	64.0	18	36.0	50 (100%)

**Table 3: Co-morbidity of HADS depression with PTSD diagnosis**

PTSD Diagnosis	Normal (0-7)		Clinical range (8+)		Total
	Count	Percentage	Count	Percentage	
No	30	78.9	8	21.1	38 (100%)
Yes	4	33.3	8	66.7	100
Total	34	68.0	16	32.0	50 (100%)

Kennedy & Evans (2001) had a slightly higher co-morbidity rate where 75% with high and 29% with low IES scores had clinical anxiety. For depression, 92% of the high and 22% of the low IES group had clinical depression. Again comparisons need to be considered with caution because different measures were used.

### ***3.2.6 Psychosocial characteristics***

#### ***Previous contact with a psychologist or psychiatrist***

Forty-four (88%) participants reported no previous contact with a psychologist or psychiatrist before sustaining their injury and six (12%) reported they had.

#### ***Social support***

The mean number of social supports was 19.24 (SD=13.41, range=0-54). The mean satisfaction with social support was 33.12 (SD=4.31, range=16-36). The satisfaction scores were markedly skewed towards the upper limit of the measure: 26 (52%) participants got maximum satisfaction scores.

### ***3.2.7 Cognitive characteristics***

Posttraumatic cognitions were measured using the PTCI total scores and 3 sub-scale scores. The mean total score was 78.86 (SD=31.14, range=37-162). The sub-scale scores are scaled scores with means as follows; negative cognitions about the self (mean=2.15, SD=1.01, range=1.00-5.14), negative cognitions about the world (mean=3.04, SD=1.36, range=1.00-6.29) and self-blame (mean=2.50, SD=1.62, range=1.00-6.60).



### 3.3 *Investigation of hypotheses*

#### 3.3.1 **Hypothesis 1a) Injury severity (as indexed by impairment severity and disability severity) will be associated with PTS symptoms**

As the impairment severity measure was ordinal and had several tied values, a non-parametric Kendall's Tau correlation was conducted. This revealed a significant positive correlation between impairment severity and PTS symptoms (Tau= .222,  $p=.039$ ).

A Pearson's correlation revealed a significant relationship between disability severity and PTS symptoms ( $r= -.441$ ,  $p=.001$ ). The negative correlation reflects the negative scoring on the FIM where lower scores indicate greater disability.

There was therefore evidence to support the hypothesis that injury severity was associated with PTS symptoms. Greater injury severity was correlated with greater PTS symptoms.

#### **Hypothesis 1b) Injury severity will be associated with PTSD diagnosis.**

For impairment severity and PTSD diagnosis, a Mann-Whitney test revealed no significant differences in impairment severity between those with and without a PTSD diagnosis ( $U= 177.00$ ,  $p=.234$ ).

For disability severity and PTSD diagnosis, an independent samples t-test revealed no significant differences between those with PTSD and those without PTSD in disability severity ( $t(48)= 1.111$ ,  $p=.272$ ).

These findings suggest there was no evidence to support the hypothesis that injury severity or disability severity was associated with PTSD diagnosis.

### 3.3.2 **Hypothesis 2a) Female gender will be positively associated with PTS symptoms**

A Mann-Whitney test revealed no significant differences between men and women in PTS symptoms ( $U=95.000$ ,  $p=.063$ ) although there was a trend in the predicted direction.

There was therefore weak evidence to suggest that female gender was positively associated with PTS symptoms. As this finding did not reach significance, it could be due to chance and therefore should be treated with caution.

### **Hypothesis 2 b) Female gender will be positively associated with PTSD diagnosis.**

A Fisher's Exact Probability Test found no significant relationship between PTSD diagnosis and gender ( $p=.542$ ).

There was therefore no evidence to support the hypothesis that women would have more PTSD diagnoses than men.

**3.3.3**                    **Hypothesis 3a) Pre-morbid psychiatric contact will be *positively* associated with PTS symptoms**

A Mann-Whitney test revealed no significant differences between those with and without a psychiatric history in PTS symptoms ( $U=128.000, p=.459$ ).

There was therefore no evidence to suggest that pre-morbid psychiatric history was positively associated with PTS symptoms.

**Hypothesis 3 b) Pre-morbid psychiatric contact will be *positively* associated with PTSD diagnosis.**

A Fisher's Exact Probability Test found no significant relationship between PTSD diagnosis and previous psychiatric contact ( $p=.141$ ).

There was therefore no evidence to support the hypothesis that participants with previous psychiatric contact would have more PTSD diagnoses than those without.

**3.3.4**                    **Hypothesis 4 a) Social support (number and satisfaction) will be *negatively* associated with PTS symptoms**

A Pearson's correlation revealed no significant relationship between number of social supports and PTS symptoms ( $r=.016, p=.455$ ).

For satisfaction with social support, a Pearson's correlation revealed a significant negative correlation between satisfaction with social support and PTS symptoms ( $r = -.355, p = .006$ ).

There was therefore no evidence to suggest a negative association between number of social supports and PTS symptoms but there was evidence to suggest that high social support satisfaction was associated with less severe PTS symptoms.

**Hypothesis 4 b) Social support (number and satisfaction) will be *negatively* associated with PTSD diagnosis**

A Mann-Whitney test revealed no significant difference in numbers of social supports between those with and without PTSD diagnoses ( $U = 212.000, p = .716$ ).

A Mann-Whitney test revealed no significant difference in satisfaction with social support according to diagnosis ( $U = 162.500, p = .054$ ), although there was a trend in the predicted direction -for satisfaction to be negatively associated with PTSD diagnosis.

There was no evidence to suggest any association between number of social supports and PTSD diagnosis. However, a trend suggested weak evidence of an association between satisfaction with social support and PTSD diagnosis. As this finding did not reach significance, it could be due to chance and therefore should be treated with caution.

### 3.3.5 Hypothesis 5 a) Negative appraisals will be positively associated with PTS symptoms

A Pearson's correlation revealed a significant positive relationship between PTCI total score and PTS symptoms ( $r = .651, p < .0005$ ). Significant positive relationships also emerged between two of the three PTCI sub-scale scores and PTS symptoms, 'negative cognitions about the self', ( $r = .594, p < .0005$ ) and 'negative cognitions about the world', ( $r = .628, p < .0005$ ). There was no significant correlation between 'self-blame' and PTS symptoms ( $r = .204, p = .078$ ) although there was a trend in the expected direction.

There was therefore evidence to support the hypothesis that negative cognitive appraisals were positively associated with PTS symptoms, particularly 'negative cognitions about the self' and 'negative cognitions about the world'. The trend for self-blame suggests weak evidence in the same direction but, as the finding did not reach significance, it should be treated with caution.

### Hypothesis 5 b) Negative appraisals will be positively associated with PTSD diagnosis.

Mann-Whitney tests revealed significant differences between the PTSD and no-PTSD groups in PTCI total scores ( $U = 67.000, p < .0005$ ), 'negative cognitions about the self' scores ( $U = 48.000, p < .0005$ ) and 'negative cognitions about the world' scores ( $U = 110.000, p < .005$ ). However, there were no significant differences in the PTSD and no PTSD groups in terms of self-blame ( $U = 163.000, p = .133$ ).

There was therefore evidence to support the hypothesis that negative cognitive appraisals were positively associated with PTSD diagnosis for the total cognitions score and the sub-

scales ‘negative cognitions about the self’ and ‘negative cognitions about the world’. However, contrary to this hypothesis, no significant relationship was found between ‘self-blame’ and PTSD diagnosis.

The findings for hypotheses 1-5 are summarised in Table 4 below.

**Table 4:** *Summary table of the findings for hypotheses 1 to 5*

<i>Variable</i>	<i>Significance of Findings (Sig.)</i>		<i>Support for Hypotheses</i>
	<b>PTS symptoms</b>	<b>PTSD diagnosis</b>	
<i>Injury severity</i>			
Impairment severity	Sig. (+) *	N.S.	1a supported, 1b not
Disability severity	Sig. (+) **	N.S.	1a supported, 1b not
<i>Demographics</i>			
Gender	Trend (+)	N.S.	2a weak support, 2b not
<i>Psychosocial factors</i>			
Previous psychiatric history	N.S.	N.S.	3a and 3b not supported
Social support- Number	N.S.	N.S.	4a and 4b not supported
Social support- Satisfaction	Sig. (-) *	N.S. Trend (-)	4a supported, 4b weak support
<i>Cognitive factors</i>			
Cognitions –total	Sig. (+) ***	Sig. (+) ***	5a and 5b supported
Negative cognitions re: self	Sig. (+) ***	Sig. (+) ***	5a and 5b supported
Negative cognitions re: world	Sig. (+) ***	Sig. (+) **	5a and 5b supported
Self-blame	Trend (+)	N.S.	5a weak support, 5b not

(+) = Positive relationship    (-) = Negative relationship    N.S. = non-significant  
P-values:        \* < .05,        \*\* < .005,        \*\*\*< .0005

3.3.6

**Hypothesis 6 a)** *Negative appraisals will predict unique variance in PTS symptoms over and above that contributed by disability severity, gender, previous psychiatric history and social support.*

A hierarchical multiple linear regression was performed with PTS symptoms as the dependent variable. The independent variables were entered in the following blocks:

1. Injury severity (using disability severity only), gender, previous psychiatric history and social support (numbers and satisfaction). The impairment severity rating was not included because it was ordinal data and so unsuitable for linear regression analysis.

The **enter** method was used to ensure that all these non-cognitive variables were included in the analysis, ensuring the maximum predictive power.

2. The three cognition sub-scales including 'negative cognitions about the self', 'negative cognitions about the world' and 'self-blame'.

The **stepwise** method was used to ensure that only variables that significantly improved the predictive power were included.

For block one, when the non-cognitive variables were entered, the multiple  $R = .595$  and adjusted  $R^2 = .281$ . This was significant ( $F(5,44) = 4.823, p = 0.01$ ). Examination of this regression equation revealed the significant predictors were disability severity ( $t = -3.368, p = .002$ ) and satisfaction with social support ( $t = -2.750, p = .009$ ).

In block two, after the non-cognitive variables, two of the cognitive sub-scales were entered as significant predictors.

The first step included 'negative cognitions about the world'. The amount of explained variance increased to multiple  $R = .752$  and adjusted  $R^2 = .505$ . This significantly contributed to the prediction of PTS symptoms ( $F(6,43) = 9.316, p < .0005$ ). The  $R^2$  change between block one and block two on the first step was significant ( $F \text{ change}(1,43) = 20.884, p < .0005$ ). Examination of the regression equation revealed the significant predictors were 'negative

cognitions about the world’ ( $t= 4.570, p< .0005$ ), disability severity ( $t= -2.479, p= .017$ ) and female gender ( $t= 2.169, p= .036$ ).

On the second step of block two, the cognitive sub-scale ‘negative cognitions about the self’ was entered to produce the final model. The amount of explained variance increased to multiple  $R= .798$  and adjusted  $R^2= .576$ . This significantly contributed to the prediction of PTS symptoms ( $F(7,42)= 10.513, p< .0005$ ). The  $R^2$  change between the first and second step was significant ( $F$  change (1,42) = 8.259,  $p= .006$ ). Examination of the regression equation revealed the significant predictors were ‘negative cognitions about the world’, ‘negative cognitions about the self’, female gender and disability severity. The summary statistics for these can be seen in Table 5 below.

**Table 5:** *Summary statistics of predictive variables within the multiple linear regression*

Predictor	Unstandardised Coefficients B	Standard error	<i>t</i>	Sig.
Negative cognitions about the world	4.510	1.268	3.556	.001
Negative cognitions about the self	4.829	1.680	2.874	.006
Gender	9.797	4.141	2.366	.023
Injury Severity (disability only)	-.373	.057	-2.296	.027

This regression provides support for hypothesis 6a. While the non-cognitive variables explained a significant amount of variance in PTS symptoms, two of the three cognitive sub-scales had significant additive effects. The significant  $R^2$  change findings demonstrate that the two cognitions sub-scales predicted unique variance over and above the non-cognitive variables. One of the cognitive variables (‘self-blame’) was not a significant predictor, however, which was contrary to the hypothesis.



**Hypothesis 6 b) The negative appraisal sub-scales will predict unique variance in PTSD diagnosis over and above that contributed by injury severity (impairment severity and disability severity), gender, previous psychiatric history and social support.**

As the dependent variable (PTSD diagnosis) was discrete rather than continuous, a binary logistic regression was performed. The independent variables were entered in the following blocks:

1. Injury severity (using both disability severity and impairment severity), gender, previous psychiatric history and social support (numbers and satisfaction).

The **enter** method was used to ensure that all these non-cognitive variables were included in the analysis, ensuring the maximum predictive power.

2. The three cognition sub-scales including 'negative cognitions about the self', 'negative cognitions about the world' and 'self-blame'.

The **stepwise** method was used to ensure only variables that significantly improved the predictive power were included, (with removal testing based on the probability of the Wald statistic).

The first model was found to be non-significant as indicated by the chi-square statistic ( $\chi^2(10) = 16.837, p = .078$ ).

The second model was found to be significant ( $\chi^2(11)= 31.060, p= .001$ ), correctly predicting 90% of the PTSD and non-PTSD cases. One significant predictor variable was identified, 'negative cognitions about the self' (Wald (1)= 6.044,  $B= 2.804$ , S.E.= 1.141,  $p= .014$ ).

This finding partially supports hypothesis 6b. One of the cognitive variables, 'negative cognitions about the self', predicted variance in PTSD diagnosis over and above the non-cognitive variables, which did not predict a significant amount of variance. The two other cognitive variables ('negative cognitions about the world' and 'self-blame') also did not predict significant variance in PTSD diagnosis, however, which was contrary to the hypothesis.

### ***3.4 Summary of results***

#### ***Characteristics of the sample***

In terms of characteristics, this sample of 50 SCI rehabilitation in-patients was 86% men with a mean age of 38.9 years. The most common cause of SCI was RTA followed by sporting accidents. There were similar numbers of participants with tetraplegic (60%) and paraplegic (40%) injuries. The average time since injury was 3-9 months. In terms of PTSD, 24% of participants met the diagnostic criteria. In terms of co-morbid anxiety and depression, 66.7% of those with PTSD diagnoses and 26.3% of those without PTSD diagnoses had clinically significant anxiety. For depression, 66.7% of those with PTSD diagnoses and 21.1% of those without PTSD diagnoses had clinically significant depression.

### Hypotheses 1-5

The relationships between each of the variables and PTS symptoms were as follows. Significant relationships were found for greater injury severity to be related to greater PTS symptoms. There was no significant difference according to gender although there was a trend for women to have greater PTS symptoms. Previous psychiatric history and number of social supports were not associated with PTS symptoms but a significant negative relationship was found for higher satisfaction with social support and lower PTS symptoms. Positive significant relationships were found for high scores on 'negative cognitions about the self', 'negative cognitions about the world' as well as a positive trend for 'self-blame' and greater PTS symptoms.

Fewer significant relationships were observed with PTSD diagnosis. The only findings were of a negative trend for high satisfaction with social support to be related to fewer diagnoses and higher scores on the cognitive variables of 'negative cognitions about the self' and 'negative cognitions about the world' to be significantly related to more diagnoses.

### Hypotheses 6a and 6b

For hypothesis 6a, the linear regression analysis indicated that non-cognitive factors accounted for 28.1% of the variance in PTS symptoms. The cognitive sub-scales of 'negative cognitions about the world' and 'negative cognitions about the self' predicted unique additive variance in PTS symptom severity not accounted for by non-cognitive factors or 'self-blame'. With cognitive factors included, 57.6% of the variance was explained. Of the non-cognitive variables, injury severity and gender were the only significant predictors in the final model.

For hypothesis 6b, the logistic regression analysis revealed that the cognitive sub-scale of ‘negative cognitions about the self’ was the only variable to predict significant variance in PTSD diagnosis. It correctly identified 90% of PTSD and non-PTSD cases.

## **4. DISCUSSION**

This section begins with an overview of the main research aims. After a discussion regarding the representativeness of the sample, it summarises and interprets the findings according to the hypotheses and with reference to the theoretical and empirical literature. A critique of the methodology is followed by consideration of the clinical implications and directions for future research. Finally, the conclusions from the study are presented.

### ***4.1 Overview of the main research aims***

This study aimed to investigate factors associated with persisting PTSD symptoms in an SCI sample. PTSD diagnosis was also addressed. Within the framework of a cognitive model, it also sought to determine how predictive cognitive appraisals would be when compared with other known predictor variables from the empirical literature. These were injury severity, gender, previous psychiatric history and social support.

### ***4.2 Summary and interpretation of results***

#### ***4.2.1 Representativeness of the sample***

##### *Demographics and injury characteristics*

The demographic and injury characteristics of this sample reflect the national epidemiological statistics for people who sustain traumatic SCI (Kennedy, 1991). The sample was comparable to previous research in terms of age (Kennedy & Evans, 2001 and Radnitz et al., 1995) and gender (Kennedy & Evans, 2001). Radnitz and colleagues and Boyer et al., (1998) recruited all male participants because of the small numbers of women who sustain SCI.

The most common cause of SCI in the present sample was RTA and there were approximately even numbers of people with tetraplegia (60%) and paraplegia (40%). These findings mirror previous research (Boyer et al., 1998, Radnitz et al., 1998 and Kennedy & Evans, 2001). There were no significant differences between the present study and Kennedy & Evans' in disability severity (using mean scores on the FIM).

Time since injury was different across studies. The present study examined a sample of inpatients with an average time since injury of 3-9 months. Kennedy and Evans investigated a slightly earlier time frame (6weeks-6months), Radnitz et al., (1998) investigated a mixed sample including inpatients and outpatients with a much higher average time since injury (18.75 years).

#### *PTS symptoms and PTSD diagnosis*

PTS symptom scores in the present sample were similar to those reported by Kennedy & Evans (2001). There were no significant differences between IES means.

In terms of PTSD diagnosis, the present study found 24% of the sample met DSM-IV criteria. This takes an intermediate position in the range reported in previous SCI samples, with Radnitz et al., (1995) reporting 12-17% and Boyer et al., (1998) reporting 33%. The prevalence rate in the present study is most similar to the conditional risk of PTSD derived from epidemiological reviews of 25% (Green, 1995).

#### *Co-morbidity of anxiety and depression*

The present study found that the majority of those with PTSD and a minority of those without PTSD also had clinically significant anxiety and depression. This was broadly similar to Kennedy & Evans (2001).

## *Summary*

Overall these comparisons suggest the current sample is representative of the SCI inpatient population. However, comparisons of PTSD rates and mood measures need to be viewed with some caution as studies have used different measures, varying in content and administration. In terms of PTSD prevalence, this sample is comparable to the general population rates following trauma exposure.

### *4.2.2 The findings according to hypotheses*

Overall, it is of note that more significant relationships were found between the predictor variables and PTS symptoms than with PTSD diagnosis (particularly for the non-cognitive variables). A possible explanation lies in the fact that PTS symptoms, as measured by the IES, do not overlap entirely with DSM-IV PTSD symptoms and so differences across the two measures may reflect the possibility that they are influenced by different predictors. Another potential explanation is that a ‘grouping-effect’ could reduce the variance and the probability of significant findings for PTSD diagnosis. Brewin et al., (2000) noted that continuous symptom measures (such as the IES) generate larger effects because of the absence of the attenuating effect of diagnostic grouping.

**Hypotheses 1a and 1b: Injury severity (as indexed by impairment severity and disability severity) will be associated with PTS symptoms (1a) / PTSD diagnosis (1b)**

The present study found both greater impairment severity and disability severity to be associated with increased PTS symptoms. This supported hypothesis 1a. However, no relationships were found between impairment severity or disability severity and PTSD diagnosis, which did not support hypothesis 1b.

### Impairment severity and PTS symptoms

The present study supported Boyer et al., (1998) who found those with greater impairment had more PTS symptoms. This may indicate that people with more severe injuries, perhaps because of longer hospital admissions and therefore greater delays in returning to normal, found it harder to view the trauma as a past event. This could contribute to the sense of current threat put forward by the cognitive model as maintaining persistent PTSD (Ehlers & Clark, 2000).

While this finding and interpretation is supported by more general injury severity studies (e.g. Blanchard et al., 1995), other SCI studies have produced conflicting findings. Radnitz et al., (1998) found that those with less severe paraplegic injuries had greater PTS symptoms than those with tetraplegia, which they relate to impaired psycho-physiological arousal systems in the latter. These findings have not been replicated in civilian UK samples however. Kennedy & Evans (2001) found no effect of injury level on PTS symptoms but found that those with ‘complete’ injuries (more severe) had more symptoms than those with ‘incomplete’ injuries.

### Impairment severity and PTSD diagnosis

The present study found no effect of impairment severity on PTSD diagnosis, which was also consistent with Boyer et al., (1998). The fact that both the present study and Boyer et al. found symptom effects but no diagnosis effects suggests that diagnostic grouping could have inhibited significant findings. This is perhaps supported by the fact that several studies in the general physical injury literature found no relationship between injury severity and PTSD diagnosis (e.g. Epstein 1993; Ehlers et al., 1998). However, inconsistent with this is the finding by Radnitz et al., as described above with symptoms, that those with less severe SCI had more PTSD diagnoses.



One possible explanation for why these impairment findings and comparisons are so mixed in SCI samples is that both the Radnitz et al., (1998) and Boyer et al., (1998) examined injury severity in dichotomous terms (paraplegia or tetraplegia). Kennedy and Evans (2001), although investigating the full range of injury levels, examined ‘level’ and ‘completeness’ separately. The present study used a more comprehensive measure, which took into account ‘completeness’ as well as the full range of injury levels, and so was an arguably more accurate measure of impairment. The measurement differences may explain some of the inconsistency in findings.

#### *Disability severity and PTSD symptoms*

The present finding of a positive relationship between disability severity and PTS symptoms was inconsistent with Kennedy and Evans (2001), which was the only other study that examined disability severity and PTS symptoms in an SCI sample. Although no clear conclusions can be drawn on the basis of two studies, time since injury may have a role. The present study examined a longer time interval post-injury than Kennedy & Evans who saw participants between 6weeks and 6months. This explanation is supported by the more general literature that suggests disability severity is more predictive of PTS symptoms in the longer term (e.g. Jeavons, 2000). Ehlers et al., (1998) found persistent medical problems were more predictive of PTS symptoms at longer intervals post-trauma. Blanchard et al., (1995) suggest that disability may serve as a constant reminder of the trauma and Ehlers et al., (1998) assert that disability presents the person with chronic stressors that can exceed their coping resources therefore making it more difficult to overcome the trauma.

#### *Disability severity and PTSD diagnosis*

The present study’s lack of finding for PTSD diagnosis cannot be interpreted according to the SCI literature because it has not been examined before. However, it does not support the more

general injury literature, which has found positive relationships between disability and PTSD diagnosis (Ehlers et al., 1998). The finding of an effect for symptoms but not for diagnosis in relation to disability severity may be due to the effects of the grouping of the diagnosis variable coupled with the small sample size which may have made it more difficult to get a significant diagnosis effect.

**Hypotheses 2a and 2b: Female gender will be positively associated with PTS symptoms (2a)**  
**/ PTSD diagnosis (2b)**

The present study found a trend for women to have higher PTS symptom scores but found no gender effects for PTSD diagnosis. Hypothesis 1a was therefore weakly supported while 1b was unsupported.

**PTS Symptoms**

Only one SCI study has examined the gender effect in relation to PTS symptoms. Kennedy & Evans (2001) found a significant effect of gender using the IES, which was supported by the trend found in the present study. This may have reached significance with a larger sample as the present sample only included seven women. Such small numbers make any effect difficult to detect statistically. The trend for gender is supported by the general PTSD literature where women have been consistently found to have greater PTSD symptomatology than men. Breslau et al., (1997) have explained this in terms of probable interactions with other PTSD risk factors (e.g. pre-morbid psychiatric history) which are more prevalent in women.

**PTSD diagnosis**

The only SCI study that investigated gender and PTSD diagnosis was Boyer et al., (1998) who found no gender effect. This was supported by the present study. Differences between the findings of Kennedy & Evans and Boyer et al. and between symptoms and diagnosis

within the present study may be due to the attenuating grouping effects of PTSD diagnosis, but this is a speculative suggestion. Clearly, further research with larger samples (including more women) is needed to clarify this question. Another possible interpretation of these mixed findings is that gender may be less predictive in samples where physical injury was or was part of the traumatic event. Other physical injury research has found mixed effects of gender (e.g. Jeavons, 2000 found no effect and Ehlers et al., 1998 found women had higher PTSD rates).

**Hypotheses 3a and 3b: *Pre-morbid psychiatric contact will be positively associated with PTS symptoms (3a) / PTSD diagnosis (3b)***

The present study found no relationships for previous psychiatric history with either PTS symptoms or PTSD diagnosis, which does not support hypotheses 3a or 3b.

As this variable has not been examined previously in the SCI literature, it is not possible to determine whether these findings would be typical of this population. However, they are inconsistent with general physical injury (e.g. Ehlers et al., 1998) and PTSD literature (e.g. Breslau, 1998) where positive relationships between PTSD symptomatology and previous psychiatric history are consistently reported.

A possible explanation for the inconsistency with the PTSD literature may lie in the way in which samples are recruited across different studies. The present sample was consecutively recruited on the basis of injury in a medical setting. This differs from the way most clinical samples are recruited. These can be biased towards self-selected help-seeking populations in mental healthcare settings where it would be reasonable to expect higher proportions of

participants with previous psychiatric histories. However, this does not explain Ehlers et al.'s (1998) positive finding in a consecutively recruited sample in a medical setting.

The present study examined self-reported previous psychiatric history, which is liable to error (e.g. social desirability effects) which may have led to underestimation. The narrowness of the question ("have you ever seen a psychologist or psychiatrist before you were injured?") could also have contributed to underestimation. Participants may have seen a range of professionals for prior mental health issues who were not psychologists or psychiatrists (e.g. GP, CPN or counsellor). This is supported by the fact that psychiatrists tend to see more severe cases and psychologists, being a relatively rare resource, are not often accessed. This may explain differences between the present study and Ehlers et al. -they assessed previous psychiatric history more comprehensively.

Another factor that may have influenced the lack of findings for this variable is that small numbers of participants reported having a previous psychiatric history (6), which made it more difficult to find significant effects.

There may also be an interaction effect between gender and reporting of previous psychiatric history. As discussed earlier, Brewin et al., (2000) noted that women are more willing to report symptoms than men. Given that this was a predominantly male sample, this may help explain why so few reported a previous psychiatric history.

**Hypotheses 4a and 4b: Social support (number and satisfaction) will be negatively associated with PTS symptoms (4a) / PTSD diagnosis (4b)**

The present study found no relationships between number of social supports and either PTS symptoms or diagnosis, which was inconsistent with the hypotheses. However, a significant relationship was found for high satisfaction with social support relating to lower PTS symptoms and a trend in this direction was found for satisfaction with social support and diagnosis, which support the hypotheses.

Although the SSQ6 has not been used in relation to PTSD in an SCI sample before, Kennedy et al., (1995) have used it to investigate more general correlates of psychological impact of SCI (using the intrusion sub-scale of the IES, among other measures) in an in-patient sample. They found, similarly to the present study, that while number of social supports was unrelated, satisfaction with social support was negatively related to psychological impact. This may indicate that number of social supports has little influence on psychological outcomes following SCI. This was consistent with Danner and Radnitz (2000) who found, in an SCI sample, that perceived quality of social support (which more closely parallels satisfaction than number) was negatively related to PTSD symptomatology. Danner and Radnitz concluded that perceived quality of social support is a protective factor against PTSD symptomatology. This interpretation supports the present findings.

Satisfaction with social support as a protective factor is also consistent with the general PTSD literature, where social support, (as largely measured in terms of perceived quality) has been repeatedly found to have negative relationships with PTSD (e.g. Brewin et al., 2000; Vail & Harrell, 1987).

It is important to note that the relationship between satisfaction and diagnosis was a trend. The ceiling effect with satisfaction may be partly responsible for this as it reduces the chance of finding a significant relationship. The ceiling effect could be a function of this in-patient sample where there was more opportunity to gain social support (e.g. from nurses, other patients in the same situation)- Kennedy et al., (1995).

**Hypotheses 5a and 5b: Negative appraisals will be positively associated with PTS symptoms**

**(5a) / PTSD diagnosis (5b)**

Significant positive relationships were found for total negative cognitions and two of the subscales, ‘negative cognitions about the self’ and ‘negative cognitions about the world’ in relation to PTS symptoms and diagnosis. These findings support the hypotheses. There was a positive trend for ‘self-blame’ relating to higher PTS symptoms, which weakly supported the hypothesis. However, no relationship was found between ‘self-blame’ and PTSD diagnosis, which was inconsistent.

This overall pattern of findings is consistent with the theoretical assertion of the cognitive model –that negative appraisals about the trauma and trauma-sequelae play a key role in chronic PTSD (Ehlers & Clark, 2000).

The significant findings for ‘negative cognitions about the self’ are supported by the empirical research of Foa & Riggs (1993) and Ehlers & Steil (1995). Dunmore et al., (1999) assert that ‘negative cognitions about the self’ can maintain persistent PTSD through creating a sense of persistent current threat that resides *within* the person. For example, the experience of PTS symptoms can be viewed as a sign of inadequacy (“I am weak”). Some may interpret their emotional responses as signs of being ‘unstable’ or ‘out of control’. Such emotions therefore

become a threat to their view of themselves. Dunmore et al. assert that inability to trust oneself can lead to particularly pervasive anxiety, avoidance and impairment in daily functioning. Furthermore, they assert that cognitions regarding one's life having been permanently damaged can impede acceptance and may contribute directly to diminished interest and the sense of a foreshortened future, characteristic of PTSD.

The significant findings for 'negative cognitions about the world' support the findings of Janoff-Bulman (1992) and Dunmore et al., (1999). The latter argue that negative cognitions about the world can lead to a sense of current threat by motivating individuals to engage in avoidance and safety behaviours. These cognitive/ behavioural strategies may maintain negative beliefs in the long term by protecting them from disconfirmation.

The trend for 'self-blame' to be associated with increased PTS symptoms was in the predicted direction. 'Self-blame' has been related to social withdrawal and a lower likelihood of discussing the trauma with others (Joseph et al., 1993). Ehlers & Clark (2000) assert that this can maintain PTSD through the reduction of opportunities for therapeutic reliving.

The lack of findings for 'self-blame' in relation to PTSD diagnosis is inconsistent with most of the empirical literature (e.g. Frazier & Schauben, 1994). The fact that it was the smallest sub-scale of the PTCI (only 5 items in all) may have meant that it lacked sufficient variance. This coupled with the inhibiting effect of grouping for diagnostic comparisons may have made significant findings less likely.

**Hypotheses 6a and 6b: The cognitive appraisal sub-scales will explain unique variance in PTS symptoms (6a) and PTSD diagnosis (6b) over and above that contributed by injury severity, gender, previous psychiatric history and social support**

Both the linear regression investigating predictors of PTS symptoms and the logistic regression investigating predictors of PTSD diagnosis found that cognitive variables significantly predicted unique variance in PTS symptoms and PTSD diagnosis over and above the non-cognitive variables. These findings support the hypotheses and are consistent with the empirical literature (e.g. Ehlers et al., 1998; Dunmore et al., 1999 and Ehlers and Steil, 2000).

The final model for the linear regression found that the strongest predictors of PTS symptoms were ‘negative cognitions about the world’ followed by ‘negative cognitions about the self’. It also found that some of the non-cognitive variables were significant predictors (gender and disability severity).

The combined effect of non-cognitive (accounting for 28.1% of the variance) and cognitive variables in increasing the accuracy of prediction (to 57.6% of the variance) can perhaps be understood as a model of interactions. Such a model is advocated by Brewin et al., (2000) in understanding their meta-analytic findings. They assert that their data is consistent with a model in which pre-trauma factors interact with trauma severity and trauma responses to increase the risk of PTSD. Joseph et al., (1993) emphasise that responses to trauma are multiply determined and argue that although the first determinant is trauma severity (as the necessary aetiological factor in PTSD), the emotional processing of the trauma interacts with other factors within the individual and his/her social environment. Furthermore, they assert



that negative appraisals are likely to contribute to the severity and chronicity of PTSD symptoms.

Applying this assertion to the present findings, it is likely that injury severity could have influenced the content of negative cognitions. For example, those with more severe injuries may be more likely to have 'permanent change' cognitions, which prevent them from accepting the trauma and viewing it as a past event. It is also possible that pre-trauma factors (such as gender) may exert a separate influence on how the trauma is perceived and responded too in terms of cognitive appraisals. Such a model may help account for the large amount of individual variance in the chronicity and severity of PTS symptoms across individuals (Joseph et al., 1993)

This interpretation cannot be so readily applied to the logistic regression analysis, which found the only significant predictor of PTSD diagnosis was 'negative cognitions about the self'. Non-cognitive variables exerted no significant predicting effects on the variance. Again the lack of effects for all variables but the 'negative cognitions about the self' sub-scale perhaps reflects the attenuating effect of the diagnostic grouping in reducing the likelihood of significant findings. Alternatively, the fact that the one cognitive sub-scale correctly predicted 90% of the PTSD and non-PTSD cases perhaps underlines the importance of cognitive variables in the predicting of chronic PTSD over and above other variables.

### ***4.3 Methodological Critique***

Five aspects of the methodology are critiqued here - design, sample, analysis, procedure and measures.

### ***4.3.1 Design***

The cross-sectional design of this study was a major limitation. It prevented an examination of causality in any of the observed relationships and a determination of ‘true’ predictors of chronic PTSD, that only a longitudinal design could have accomplished. For example, to determine whether cognitions were truly predictive of chronic PTSD, a design where PTSD was examined again at a later second time point would be necessary. Unfortunately this was not possible because of the constraints of both time and the investigation of inpatients. A longitudinal design would have meant that many of the inpatients would be outpatients at the second time point –which would have been a significant confounding variable in itself. The study therefore examined concurrent predictors.

The predictor variables used in this study failed to account for 42.4% of the variance in PTS symptoms and 10% of the variance in diagnosis was incorrectly assigned. Unexplained variance indicates that there are other predictors that this study did not examine. Although there are a myriad of important factors this study was unable to address, perhaps the most pertinent factors are in the arena of prior vulnerability. As discussed, previous psychiatric history was not adequately assessed. Davidson & Foa (1993) argue that the interacting effects of prior trauma history (including early life adversity) and personality factors are likely to have an important influence on individuals’ responses to trauma.

### ***4.3.2 Sample***

As a formal power calculation was not conducted, the findings of this study need to be treated with caution.

Although the overall sample size was relatively small, the attrition rate was low (4.8% declined to participate). No significant differences were found between participants and non-

participants on demographic and injury characteristics. This suggests that the study was representative of the inpatient SCI population.

However, it may be less representative of the SCI population with chronic PTSD. Participants were recruited 3-24 months post-injury, which could be viewed as being on the 'early' side of PTSD chronicity. It is reasonable to expect a greater proportion of people with chronic PTSD to be outpatients with potentially different risk factors. Some of those without PTSD may also develop it (delayed onset). Simon (1999) argues that, although DSM-IV specifies a 3-month cut-off for chronic PTSD, other studies support a 1-year distinction between acute and chronic forms. The present study, placed between these two time-points, may have a mix of more acute and more chronic PTSD, which may have different predictors.

However, the fact that the majority of people with SCI experience a lengthy in-patient rehabilitation phase coupled with the fact that early PTSD symptoms have been shown to be stable over time perhaps increases the representativeness of this sample to the chronic PTSD SCI population. However, once outpatients, the predictive factors could change considerably so the findings from this sample cannot be extrapolated to wider SCI community populations.

#### ***4.3.3 Analysis***

Several of the limitations with the analysis were related to small sample size. For example, several chi-square tests could not be completed because small numbers violated the assumptions. The regression analyses, however, can be considered as robust because the ratio of predictor variables to sample size was within acceptable limits (Tabachnick & Fidell, 2001).

A large proportion of the data did not meet the assumptions of normality necessary for parametric analyses so several less powerful non-parametric analyses were performed. This was partly due to the relatively small sample size and may also have been affected by the small numbers in some groups (e.g. women and those reporting previous psychiatric history) and by the fact that there was some skewed data (e.g. social support- satisfaction).

The large number of analyses performed mean that a few of the significant results could have occurred by chance.

#### ***4.3.4 Procedure***

This study largely consisted of a series of self-report questionnaires, administered in an interview format. As these questionnaires were validated as self-report instruments their reliability and validity following interview administration is questionable and needs to be considered with caution. Participants' responses could have been influenced by a response bias related to being interviewed, which may have served to inflate or minimise scores.

The interview format had several advantages however. Firstly, it ensured consistency of administration for people with paraplegia and tetraplegia. Secondly, it was useful in clarifying questions. For example, although explicit in the instructions, several participants required clarification on PDS questions about impairment in occupational, social and leisure domains caused by PTSD symptoms. Some participants confused this with impairments in these areas caused by physical disability. Confusion with physical disability was also apparent on some of the PDS symptom questions (e.g. "having less interest in /participating less often in important activities"). Boyer et al., (1998) noted difficulties in differentiating post-traumatic avoidance from changes in behaviour imposed by physical difficulties and cautioned that their self-report method may have elevated some scores erroneously.

When administering the PDS, the interview format allowed for the narrowing down of the ‘traumatic event’ to the event that caused the SCI rather than blurring it with current stresses associated with aspects of adjustment/rehabilitation. This was done so diagnosis was rigorously adhered to. However, this procedure potentially limited the determination of the ‘core’ trauma and was therefore possibly misleading in terms of under-reporting the prevalence of PTSD.

#### **4.3.5 Measures**

Where possible, standardised measures were used to generate results that could be compared, generalised and reproduced.

##### *PTSD and PTS symptoms*

The main limitation of the PDS was that it is a self-report measure of PTSD. Foa & Meadows (1997) argue that structured interview schedules are the ‘gold standard’ in diagnosing PTSD. However, most take 30 minutes or more to complete (e.g. SCID-Spitzer, Williams & Gibbon, 1987). As it was an ethical imperative in the study to keep participation time as brief as possible, one of the rationales for selecting the PDS was that it only took 10-15 minutes. It was also selected because it was validated over a wider range of traumas than most structured interview measures (Foa & Meadows, 1997) and had been used previously with SCI populations (Boyer et al., 1998). Other studies however have reported that the PDS is more conservative in diagnosing PTSD than are interviews (Ehlers et al., 1998). This coupled with the present study’s stringent measurement of criterion F mean that the PTSD prevalence may be an underestimate and should be considered with caution.

The IES was chosen to measure PTS symptoms because it has been the best validated and most widely used measure of trauma-related psychopathology (Jeavons, 2000). However, it does not map directly onto the 17 DSM-IV PTSD symptoms (in particular, it omits arousal symptoms) so, although it correlates highly with PTSD diagnosis, there is no guarantee that its relationship to potential risk factors is the same (Brewin et al., 2000).

Injury severity

Conceptually there are limitations with using injury severity as a measure of trauma severity. It is only one facet of trauma severity (something else about the event that caused the injury may have contributed to trauma severity). However, as an objective indicator, it is not vulnerable to recall bias problems of subjective reporting. Also the present study improved on previous injury studies by taking into account both impairment and disability.

Impairment severity measure

The impairment severity measure was a systematic, objective measure of SCI severity, which was designed to have clinically and functionally significant gradations. Limitations with this measure include the fact that it has not been validated so its psychometric properties remain unknown. The fact that the measure was ordinal prevented it from being used in linear regression analysis. This limited its utility, as the influence of impairment severity on predicting PTS symptom severity could not be ascertained.

Disability severity: FIM

The main limitation with the FIM was that it has significant floor and ceiling effects. For example, for the two sections measuring communication and social cognition, most participants obtained the highest score –leading to a ceiling effect. This may be partly due to the exclusion of people with moderate-severe head injuries. Floor effects were apparent for

those with high-level tetraplegic injuries. These effects made the measure insensitive to small differences in disability severity.

### *Social Support*

The SSQ6 had two main limitations. Firstly, it measured participants' perceptions of their social network rather than the actual behaviour. Secondly, the measure was problematic in the present sample because 52% of participants reported maximum satisfaction -which created a ceiling effect that skewed the data, forcing it to be analysed non-parametrically. The ceiling effect may be related to the fact that it was an inpatient population where individuals were likely to have high levels of social support.

### *Negative Post traumatic cognitions*

The PTCI is a relatively new measure that has not been used in any published research, as far as the author is aware. It lacks cut-off or normative data with which to determine whether negative cognitions scores were 'high' or 'low'. It is therefore difficult to give an impression regarding what level average scores in this sample were at and what they meant clinically. Although it has good psychometric properties, its validity with SCI populations has yet to be established.

### *Anxiety and Depression*

The brevity of the HADS limited its scope compared to more detailed measures (e.g. BDI-Beck et al., 1967 or STAI –Spielberger et al., 1983). Despite the advantage of having been developed for use in hospital populations (to prevent erroneous inflation of scores due to the confounding effects of somatic symptoms), it has not been previously used with SCI samples. This limited co-morbidity comparisons with other studies.

### Loss of Consciousness

Loss of consciousness was determined by means of self-report in order to exclude those with moderate/severe head injuries (as indexed by a loss of consciousness of >15 minutes). Self-reported loss of consciousness has been found to be vulnerable to inaccuracy. Mayou, Black & Bryant (2000) note that participants often overestimate length of unconsciousness and commented that it is difficult for participants to distinguish between unconsciousness, post-traumatic amnesia and peri-traumatic psychological dissociation. In this study, medical notes were also checked for head injury at the time of injury, which was hoped to curtail major reporting inaccuracies.

## **4.4 Clinical implications**

As discussed earlier, PTSD can be a highly distressing condition that can have considerable ramifications for occupational and social functioning (Shalev et al., 1996). It has a high chronicity rate where early symptoms have been shown to be stable and often persisting for years without treatment (Simon, 1999).

PTSD can be particularly problematic in SCI populations because it can interfere with progress in rehabilitation and can impair long-term adjustment to and management of disability (Williams, 1997). Indeed poor adjustment to SCI has been shown to have important economic as well as clinical implications (e.g. more frequent hospital admissions and poorer physical health long-term, Galvin & Godfrey, 2001).

In the present study, a significant proportion of the participants (24%) met the criteria for chronic PTSD. This figure would rise considerably if sub-syndromal PTSD were also considered.



The fact that considerable numbers of SCI sufferers develop PTSD following injury, with associated serious effects on long-term physical health, coupled with the fact that early symptoms often lead to chronic PTSD, points to the importance of early detection of symptoms. There is an imperative to make assessment and intervention as effective as possible to promote secondary prevention of chronicity.

The findings of the study have highlighted the importance of negative cognitive appraisals (over and above other non-cognitive variables) in the prediction of chronic PTSD. This is promising clinically as it indicates that changeable aspects (e.g. negative cognitions) explain variance beyond that explained by unchangeable aspects (e.g. injury severity). This suggests opportunities for treatment and secondary prevention of the disorder (Shalev, 2001). The study also provides support for the cognitive model of persistent PTSD and confirms its relevance to understanding PTSD in a SCI sample. Ehlers & Clark (2000) advocate cognitive behavioural therapy (CBT) to modify negative cognitive appraisals that lead to the sense of current threat.

#### ***4.4.1 Treatment***

There is much evidence of the efficacy of cognitive behavioural interventions in treating PTSD in the literature although it is beyond the scope of this paper to address them in depth (see Foa & Meadows, 1997 for a review). Kennedy & Duff (2001) note that there has been no published research concerning the treatment of PTSD following SCI.

The findings of this study, if replicated, may contribute to two aspects of CBT for people with SCI. The first is assessment. Ehlers & Clark emphasise the importance of identifying the main cognitive themes with clients and explicitly recommend using the PTCI to do this. The second

is in the realm of cognitive restructuring, a technique used to modify negative cognitive appraisals. The present study's finding that two PTCI sub-scales ('negative cognitions about the self' and 'negative cognitions about the world') were particularly predictive in the SCI sample, and not 'self-blame', may help shape priorities for CBT assessment and treatment of people with SCI.

#### ***4.4.2 Early detection***

Early detection of PTS symptoms is important because PTSD can have a chronic course and this may help target early intervention and thus prevention. The findings of the role of 'negative cognitions about the self' and 'negative cognitions about the world' could inform possible screening interviews to detect those at risk. It is important to note that, in the prediction of PTS symptoms in the present study, injury severity and demographic variables (gender) also exerted some influence. Boyer et al., (1998) notes that these factors are usually known at the time an individual enters rehabilitation and may help identify those at risk for PTSD early on. However, the present study findings suggest that this could be made more accurate by the inclusion of cognitive measures.

The current findings may have a role in informing the knowledge bases of clinical psychologists. Clinical psychologists have important roles in teaching and consultation to rehabilitation staff regarding the detection of PTSD, how to provide clients with early normalising information regarding reactions to traumatic events and about PTS symptoms so that PTSD-related difficult client behaviour can be understood in this context. Williams (1997) asserts that rehabilitation staff should routinely provide realistic assessments of emotional disorder as well as physical limitations. Williams also notes that unlike adjustment

disorders, PTSD is unlikely to resolve at the end of rehabilitation and so it is important to also liaise with and educate community services in the provision of long-term ongoing support.

#### ***4.5 Future research directions***

One of the most pertinent areas for future research is a replication of the present study with a longitudinal design. This would allow for the determination of ‘true’ PTSD predictors and causality in the observed relationships. It would also allow for examination of the course of chronic PTSD and symptom fluctuations over time (Green, 1995).

It would be beneficial if such a study was conducted with a larger sample, particularly so those variables with small numbers could be better examined (e.g. gender). Replication would also aid the validation of the PTCI in diverse samples like SCI. Similar research investigating the outpatient SCI population who are at a longer period post-injury would be helpful in determining whether the same predictive variables apply and would enhance the understanding of chronic PTSD in this population.

Another important research area is a close examination of what the ‘core’ or causal trauma(s) are for individuals following SCI. As discussed earlier, SCI can involve several potential traumas such as the initial event, the realisation of the implications of injury or other factors (Boyer et al., 1998). This has not been investigated in previous research (Kennedy & Duff, 2001) and may be best explored through qualitative designs or single case series. This could perhaps help to clarify overlaps between PTSD and adjustment-related distress, particularly in inpatients. Green (1995) argues, on a related theme, that PTSD is too narrow an outcome to focus on and advocates, as do Boyer and colleagues, more comprehensive investigations into psychological sequelae of traumatic events.

Research determining ‘core’ traumas for individuals could facilitate the exploration of possible relationships between the content of the core trauma and negative cognitive appraisals. This may help narrow down a range of predictive cognitions for those with SCI and could lead to the development of shorter possible screening measures. It may also help to shed light on theoretical understandings of interactions and mediating influences between injury variables and individual variables in the presentation of chronic PTSD. In terms of interactions, it would also be interesting to examine the impact of SCI on the wider social environment of the individual, when both inpatient and outpatient. Boyer, Knolls, Kafkalas, Tollen & Swartz (2000) have begun this research by investigating PTSD symptoms in parents of individuals with SCI.

The present study only examined one of two key variables specified by Ehlers & Clark’s (2000) cognitive model of PTSD as leading to the sense of current threat they believe drive persistent PTSD –negative cognitive appraisals. It would be interesting if future research examined the other –a disturbance of autobiographical memory and, in particular the interaction between this and negative cognitive appraisals.

Future research should try to define more precisely the way that different stressors interact during the development as well as persistence of PTS reactions, with attention to the role of pre-injury vulnerability factors.

As discussed earlier, there have been a dearth of PTSD treatment studies with SCI populations (Kennedy & Duff, 2001). These would be beneficial as an elucidation of what works for whom in treatment and, might reciprocally feedback into theory and empirical research by illuminating predictive and protective factors.

## 4.6 *Conclusions*

The study aimed to investigate factors associated with persisting PTSD symptoms in a sample of inpatients who sustained traumatic SCI. PTSD diagnosis was also investigated. Using a cognitive model of persistent PTSD, it also sought to determine the relative influence of negative cognitive appraisals, demographic and injury severity variables in predicting chronic PTSD symptoms and diagnosis.

The prevalence of PTSD in the present sample was 24%, which was comparable to other SCI samples and to other wider populations exposed to traumatic events.

Factors that were found to be associated with PTS symptoms were injury severity, satisfaction with social supports and two of the negative cognitive appraisal sub-scales, 'negative cognitions about the self' and 'negative cognitions about the world'. Positive trends were found for female gender and 'self-blame'. Fewer factors were associated with PTSD diagnosis. Among the non-cognitive variables, there was a negative trend for satisfaction with social support to be associated with PTSD diagnoses. Of the cognitive factors, 'negative cognitions about the self' and 'negative cognitions about the world' were associated with diagnosis. There were no findings for previous psychiatric history or number of social supports either for PTS symptoms or PTSD diagnosis.

'Negative cognitions about the self' and 'negative cognitions about the world' predicted unique variance in PTS symptoms compared to the non-cognitive variables although injury severity and gender were also significant predictors. For PTSD diagnosis, the only significant predictor was 'negative cognitions about the self'.

Any conclusions from this study need to be considered cautiously because of methodological limitations. The most pertinent is the cross-sectional design. The study would need to be replicated using a longitudinal design in order to explore causal relationships.

The findings were generally consistent with previous research in other client groups. In particular, the important influence of negative cognitive appraisals over and above demographic and injury severity factors supported the findings of Dunmore et al., (1999), Steil & Ehlers (2000) and Smith (personal communication).

The important role of negative cognitive appraisals also provided support for Ehlers & Clark's (2000) cognitive model and, as cognitions are potentially modifiable, the findings have important clinical implications. These include the development of CBT assessments and interventions for PTSD in people with SCI, which have, as yet, not been explored in the literature.

Future research directions include an examination of those with longer intervals since injury, particularly outpatients and a closer investigation of the 'core' trauma for people with SCI. Examination of the interaction between cognitive variables, trauma severity variables, pre-injury vulnerability factors and wider socio-environmental factors may begin to address the individual variation in the development and persistence of PTSD following SCI.

## 5. REFERENCES

- American Association of Automotive Medicine. (1985). The Abbreviated Injury Scale (Revised). Des Plaines, IL.
- American Psychiatric Association (1980). Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition (DSM-III). Washington, DC: American Psychiatric Association.
- American Psychiatric Association (1987). Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition (DSM-III-R). Washington, DC: American Psychiatric Association.
- American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV). Washington, DC: American Psychiatric Association.
- Binks,M.T., Radnitz,C.L., Moran,A.I. & Vinciguerra,V. (1997). Relationship between Level of Spinal Cord Injury and Posttraumatic Stress Disorder Symptoms. Annals of New York Academy of Sciences,821,430-432.
- Beck,A.T., Ward,C.H., Mendelson,M., Mock,J., Erbough,J. (1967). An Inventory for measuring depression. Archives of General Psychiatry,4,351-363.
- Blanchard,E.B., Hickling,E.J., Barton,K.A., Taylor,A.E., Loos,W.R. & Jones-Alexander,J. (1996a). One year prospective follow up of motor vehicle accident victims. Behaviour Research and Therapy,34,775-786.
- Blanchard,E.B., Hickling,E.J., Forneris,C.A., Taylor,A.E., Buckley,T.C., Loos,W.R. & Jaccard,J. (1997). Prediction of remission of acute posttraumatic stress disorder in motor vehicle accident victims. Journal of Traumatic Stress,10,215-234.
- Blanchard,E.B., Hickling,E.J., Mitnick,N., Taylor,A.E., Loos,W.R. & Buckley,T.C. (1995). The impact of severity of physical injury and perception of life-threat in the development of post-traumatic stress disorder in motor vehicle accident victims. Behaviour Research and Therapy,33,529-534.
- Blanchard,E.B., Hickling,E.J., Taylor,A.E., Loos,W.R. & Gerardi,R.J. (1994). Psychological morbidity associated with motor vehicle accidents. Behaviour Research and Therapy,32,283-290.
- Blanchard,E.B., Hickling,E.J., Taylor,A.E., Loos,W.R., Forneris,C.A., & Jaccard,J. (1996). Who develops PTSD from motor vehicle accidents? Behaviour Research and Therapy,34,1-10.
- Blaszczynski,A., Gordon,K., Silove,D., Sloane,D., Hillman,K., Panasetis,P. (1998). Psychiatric morbidity following motor vehicle accidents: a review of methodological issues. Comprehensive Psychiatry,39,3,111-121.
- Bowles,I.T., O’Gorman,E.C. & Sayers,A. (1991). Assault characteristics and posttraumatic stress disorder in rape victims. Acta Psychiatrica Scandinavia,83,27-30.

- Boyer,B.A., Knolls,M.L., Kafkalas,C.M., Tollen,L.G. Swartz,M. (2000). Prevalence and relationships of posttraumatic stress in families experiencing pediatric spinal cord injury. Rehabilitation Psychology,45,4,339-355.
- Boyer,B.A., Tollen,L.G. & Kafkalas,C.M. (1998). A pilot study of Posttraumatic Stress Disorder in Children and Adolescents with Spinal Cord Injury. SCI Psychosocial Process,11: 75-81.
- Brady,K.T. (1997). Posttraumatic stress disorder and comorbidity: Recognizing the many faces of PTSD. Journal of Clinical Psychology,58,(Suppl.9):12-15.
- Breslau,N. (1998). Epidemiology of Trauma and Posttraumatic Stress Disorder. In Yehuda, R. (ed), Psychological Trauma. American Psychiatric Press Inc. Washington, DC.pp1-29.
- Breslau,N. & Davis,G.C. (1987). Posttraumatic Stress Disorder: The Stressor Criterion. The Journal of Nervous and Mental Disease,175,5,255-264.
- Breslau,N. & Davis,G.C. (1992). Posttraumatic stress disorder in an urban population of young adults: risk factors for chronicity. American Journal of Psychiatry,149:671-675.
- Breslau,N., Davis,G.C., Andreski,P., Peterson,E.L. & Schultz,L. R. (1997). Sex Differences in Posttraumatic Stress Disorder. Archives of General Psychiatry,54:1044-1048.
- Brewin,C.R., Andrews,B. & Valentine,J.D. (2000) Meta-Analysis of Risk Factors for Posttraumatic Stress Disorder in Trauma-Exposed Adults. Journal of Consulting and Clinical Psychology,68,748-766.
- Brewin,C.R., Dalgleish,T. & Joseph,S. (1996). A Dual Representation Theory of Posttraumatic Stress Disorder. Psychological Review,103,670-686.
- Cahill,L., Prins,B., Weber,M. & McGaugh,J.L. (1994). Beta-adrenergic activation and memory for emotional events. Nature,371:702-704.
- Danner,G. & Radnitz,C.L. (2000). Protective factors and posttraumatic stress disorder in veterans with spinal cord injury. International Journal of Rehabilitation and Health,5,3,195-203.
- Davidson,J.R.T. & Foa,E.B. (1993). Epilogue. In: Davidson, J.R.T. & Foa E.B. (eds). Posttraumatic stress disorder: DSM-IV and beyond. Washington, DC: American Psychiatric Association.
- Davis,R.C., Brickman,E.R. & Baker,T. (1991). Effects of supportive and unsupportive responses of others to rape victims: effects of current victim adjustment. American Journal of Community Psychology,19,443-451.
- Dunmore,E., Clark,D.M. & Ehlers,A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. Behaviour Research and Therapy,37,809-829.
- Ehlers,A. & Clark,D.M. (2000). A cognitive model of posttraumatic stress disorder. Behaviour Research and Therapy,38,319-345.



- Ehlers,A., Mayou,R.A. & Bryant,B. (1998). Psychological Predictors of Chronic Posttraumatic Stress Disorder After Motor Vehicle Accidents. Journal of Abnormal Psychology,107,3,508-519.
- Ehlers,A. & Steil,R. (1995). Maintenance of intrusive memories in posttraumatic stress disorder: A cognitive approach. Behavioural and Cognitive Psychotherapy,23,217-249.
- Epstein,R.S. (1993). Avoidant symptoms cloaking the diagnosis of PTSD in patients with severe accidental injury. Journal of Traumatic Stress,6,451-458.
- Foa,E.B. (1995). The Posttraumatic Diagnostic Scale (PDS) manual. Minneapolis, MN: National Computer Systems.
- Foa,E.B., Cashman,L.J., Jaycox,L.H. & Perry,K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. Psychological Assessment, 9,4,445-451.
- Foa,E.B., Ehlers,A., Clark,D., Tolin,D.F. & Orsillo,S.M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. Psychological Assessment,11,3, 303-314.
- Foa,E.B. & Meadows,E.A. (1997). Psychosocial Treatments for Posttraumatic Stress Disorder: A Critical Review. Annual Review of Psychology,48:449-480.
- Foa,E.B. & Riggs,D.S. (1993). Post-traumatic stress disorder in rape victims. In J.Oldham, M.B.Riba, & A.Tasman, Annual Review of Psychiatry,12,(pp273-303). Washington DC: American Psychiatric Association.
- Foa,E.B., Steketee,G. & Olasov-Rothbaum,B. (1989). Behavioral/cognitive conceptualisations of post-traumatic stress disorder. Behavior Therapy,20,155-176.
- Frankel,H.L., Hancock,D.O., Hyslop,G., Melzak,J., Michaelis,L.S., Ungar,G.H., Vernon, J.D.S & Walsh,J.J. (1969). The value of postural reduction in the initial management of closed injuries of the spine with paraplegia and tetraplegia. Paraplegia,7:179-192.
- Frazier,P. & Schauben,L. (1994). Causal attributions and recovery from rape and other stressful life events. Journal of Social and Clinical Psychology,13,1-14.
- Freud,S. (1919). Introduction to the psychology of war neuroses. Standard Edition 18. London: Hogarth Press.
- Galvin,L.R. & Godfrey,H.P.D. (2001). The impact of coping on emotional adjustment to spinal cord injury (SCI): review of the literature and application of a stress appraisal and coping formulation. Spinal Cord,39,615-627.
- Green,B.L. (1995). Recent Research Findings on the Diagnosis of Posttraumatic Stress Disorder: Prevalence, Course, Comorbidity, and Risk. In R.I.Simon (ed), Posttraumatic stress disorder in litigation: Guidelines for forensic assessment. American Psychiatric Press: Washington DC.pp13-29.
- Grey,N. & Kennedy,P. (1993). The Functional Independence Measure: a comparative study of clinician and self-ratings. Paraplegia,31,457-461.

- Hamilton,B. & Granger,C. (1990). Guide for the use of the uniform data set for medical rehabilitation. Buffalo, NY: Research Foundation of State University of New York.
- Helzer,J.E., Robins,L.N., McEvoy,L. (1987). Post-traumatic stress disorder in the general population: findings of the Epidemiological Catchment Area Survey. New England Journal of Medicine,317,1630-1634.
- Horowitz,M.J. (1973). Phase-orientated treatment of stress response syndromes. American Journal of Psychiatry,31,768-781.
- Horowitz,M., Wilner,N. & Alvarez,W. (1979). Impact of Event Scale: A measure of subjective stress. Psychosomatic Medicine,41,3, 209-218.
- Janoff-Bulman,R. (1992). Shattered assumptions: toward a new psychology of trauma. New York: The Free Press.
- Jeavons,S. (2000). Predicting who suffers psychological trauma in the first year after a road accident. Behaviour Research and Therapy,38,499-508.
- Jones,J.C. & Barlow,D.H. (1990). The Etiology of Posttraumatic Stress Disorder. Clinical Psychology Review,10,299-328.
- Joseph,S. (2000). Psychometric evaluation of Horowitz's Impact of Event Scale: A review. Journal of Traumatic Stress,13,1,101-113.
- Joseph,S., Yule,W. & Williams,R. (1993). Post-Traumatic Stress: Attributional Aspects. Journal of Traumatic Stress,6,4,501-513.
- Keane,T.M., Zimmering,R.T. & Caddell,J.M. (1985). A behavioral formulation of post-traumatic stress disorder in Vietnam veterans. The Behavior Therapist,8,9-12.
- Kennedy,P. (1991). Counselling with Spinal Cord Injured People. In Counselling and Communication in Health Care. H.Davis & L.Falloweld (eds.) John Wiley & Sons Ltd.
- Kennedy,P. (1989). Psychological Approaches in the Management of Spinal Cord Injuries. Holistic Medicine,4,169-176.
- Kennedy,P. & Duff,J. (2001). Post traumatic stress disorder and spinal cord injuries. Spinal Cord,39,1-10.
- Kennedy,P. & Evans,M.J. (2001). Evaluation of posttraumatic distress in the first 6 months following SCI. Spinal Cord,39,381-386.
- Kennedy,P., Marsh,N., Lowe,R., Grey,N., Short,E., & Rogers,B. (2000). A longitudinal analysis of psychological impact and coping strategies following spinal cord injury. British Journal of Health Psychology,5,157-172.
- Kennedy,P. & Rogers,B.A. (2000). Anxiety and Depression After Spinal Cord Injury: A Longitudinal Analysis, Archives of Physical Medicine and Rehabilitation,81,932-937.

- Kessler,R.C., Sonnega,A., Bromet,E., Hughes,M., & Nelson,C.B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. Archives of General Psychiatry,52,1048-1060.
- Kulka,R.A., Schlenger,W.E., Fairbank,J.A., Hough,R.L., Jordan,B.K., Marmar,C.R. & Weiss, D.S. (1988). Contractual report of findings from the National Vietnam Veterans Readjustment Study, Vol. II: Table of Findings. Washington, DC: US Government Printing Office.
- March,J.S. (1993). What constitutes a stressor: the “criterion A” issue. In: Davidson, J.R.T. & Foa E.B. (eds). Posttraumatic stress disorder: DSM-IV and beyond. Washington, DC: American Psychiatric Association.
- Mayou,R.A., Black,J. & Bryant,B. (2000). Unconsciousness, amnesia and psychiatric symptoms following road traffic accident injury. British Journal of Psychiatry,177,540-545.
- Mayou,R.A., Bryant,B. & Duthie,R. (1993). Psychiatric consequences of road traffic accidents. British Medical Journal,307,647-651.
- Moorley,S., Greer,S., Watson,M., Gorman,C., Rowden,L., Tunmore,R., Robertson,B. & Bliss,J. (1991). The factor structure and factor stability of the Hospital Anxiety and Depression Scale in patients with cancer. British Journal of Psychiatry,158,255-259.
- Norris,F.H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. Journal of Consulting and Clinical Psychology,60,409-418.
- Power,M. & Dalgleish,T. (1997). Cognition and emotion: from order to disorder. Psychology Press.
- Radnitz,C.L., Hsu,L., Tirch,D.D., Willard,J., Lillian,L.B., Walczak,S., Festa,J., Perez-Strumolo,L., Broderick,C.P., Binks,M., Schlein,I., Bockian,N., Green,L. & Cytryn,A. (1998a). A comparison of posttraumatic stress disorder in veterans with and without spinal cord injury. Journal of Abnormal Psychology,107,(4),676-680.
- Radnitz,C.L., Hsu,L., Willard,J., Perez-Strumolo,L., Festa,J., Lillian,L.B., Walczak,S., Tirch, D.D., Schlein,I.S., Binks,M. and Broderick,C.P. (1998). Posttraumatic stress disorder in veterans with spinal cord injury: trauma related risk factors. Journal of Traumatic Stress,11,3, 505-520.
- Radnitz,C.L., Schlein,I.S. & Hsu,L. (2000). The Effect of Prior Trauma Exposure on the Development of PTSD Following Spinal Cord Injury. Journal of Anxiety Disorders,14,3,313-324.
- Radnitz,C.L., Schlein,I.S., Walzak,S., Broderick,C.P., Binks,M., Tirch,D.D., Willard,J., Perez-Strumolo,L., Festa,J., Lillian,L.B., Bockian,N., Cytryn,A. & Green,L. (1995). The Prevalence of Posttraumatic Stress Disorder in Veterans With Spinal Cord Injury. SCI Psychosocial Process,8,145-149.
- Resick,P.A., Schnicke,M.K., & Markway,B.G. (1991, November). The relationship between cognitive content and posttraumatic stress disorder. Paper presented at the annual meeting of the Association for Advancement of Behavior Therapy, New York.

- Roca,R.P., Spence,R.J. & Munster,A.M. (1992). Posttraumatic adaptation and distress among adult burn survivors. American Journal of Psychiatry,149,1234-1238.
- Sarason,B.R., Levine,H.M., Basham,R.B. & Sarason,B.R. (1983). Assessing social support: the Social Support Questionnaire. Journal of Personality and Social Psychology,44,127-139.
- Sarason,I.G., Sarason,B.R., Shearin,E.N., & Pierce,G.R (1987b). A brief measure of social support: practical and theoretical implications. Journal of Social and Personal Relationships, 4,497-510.
- Sarason,B.R., Shearin,E.N., Pierce,G.R. & Sarason,I.G. (1987a). Interrelationships of social support measures: theoretical and practical implications. Journal of Personality and Social Psychology,52,813-832.
- Segal,M.E., Ditunno,J.F. & Staas,W.E. (1993). Interinstitutional agreement of individual Functional Independence Measure (FIM) items at two sites on one sample of SCI patients. Paraplegia,31,622-631.
- Shalev,A.Y. (2001) Review:14 risk factors for post-traumatic stress disorder include childhood abuse and family psychiatric history. Commentary. Evidence Based Mental Health, 4,61.
- Shalev,A.Y., Bonne,O. & Eth,S. (1996). Treatment of Posttraumatic Stress Disorder: A Review. Psychosomatic Medicine,58,165-182.
- Simon,R.I. (1999). Chronic Posttraumatic Stress Disorder: A Review and Checklist of Factors Influencing Prognosis. Harvard Review Psychiatry,6,6,304-312.
- Smith,B. (In preparation). The role of negative interpretation, thought suppression and rumination in the maintenance of post-traumatic stress symptoms: A prospective longitudinal study. UCL,London.
- Smith,C.A. & Lazarus,R.S. (1993). Appraisal Components, Core Relational Themes, and the Emotions. Cognition and Emotion,7,(4),233-269.
- Spielberger,C.D., Gorsuch,R.L., Lushene,R.E., Vagg,P.R., & Jacobs,G.A. (1983). Manual for the Strait Trait Anxiety Inventory. Palo Alto: Consulting Psychologists Press.
- Spitzer,R.L., Williams,J.B.W. & Gibbon,M. (1987). Structured Clinical Interview for DSM-III-R, Version NP-V. New York: New York State Psychiatric Institute, Biometrics Research Department.
- Steil,R. & Ehlers,A. (2000). Dysfunctional meaning of posttraumatic intrusions in chronic PTSD. Behaviour Research and Therapy,38,537-558.
- Stinemen,M.G., Shea,J.A., Jette,A., Tassoni,C.J., Ottenbacher,K.J., Fiedler,R. & Granger, C.V. (1996). The Functional Independence Measure: tests of scaling assumptions, structure, and reliability across 20 diverse impairment categories. Archives of Physical Medicine and Rehabilitation,77(11):1101-1108.
- Stretch,R.H., Vail,J.D., & Maloney,J.P. (1985). Posttraumatic stress disorder among Army nurse corps Vietnam veteran. Journal of Consulting and Clinical Psychology,53,704-708.

Tabachnick,B.G. & Fidell,L.S. (2001). Using Multivariate Statistics.4<sup>th</sup> Edition. Allyn & Bacon, Needham Heights, Massachusetts.

Waters,R.L., Adkins,R.H. & Yakura,J.S. (1991). Definition of complete spinal cord injury. Paraplegia,9:573-581.

Weinman,J., Wright,S. & Johnston,M. (1995). Measures in Health Psychology: A User's Portfolio. Windsor: NFER-NELSON Publishing Company Ltd.

Williams,G.N. (1997). Post-traumatic Stress Disorder: Implications for Practice in Spinal Cord Injury Rehabilitation. Vocational Rehabilitation. SCI Psychosocial Process,10,1,40-42.

Wirtz,P.W. & Harrell,A.V. (1987). Effects of postassault exposure to attack-similar stimuli on long-term recovery of victims. Journal of Consulting and Clinical Psychology,55,10-16.

Yule,W., Williams,R. & Joseph,S. (1999). Post-traumatic Stress Disorders in Adults. In W. Yule (ed). Post-traumatic Stress Disorders: Concepts and Therapy. Wiley: Maryland. pp1-25.

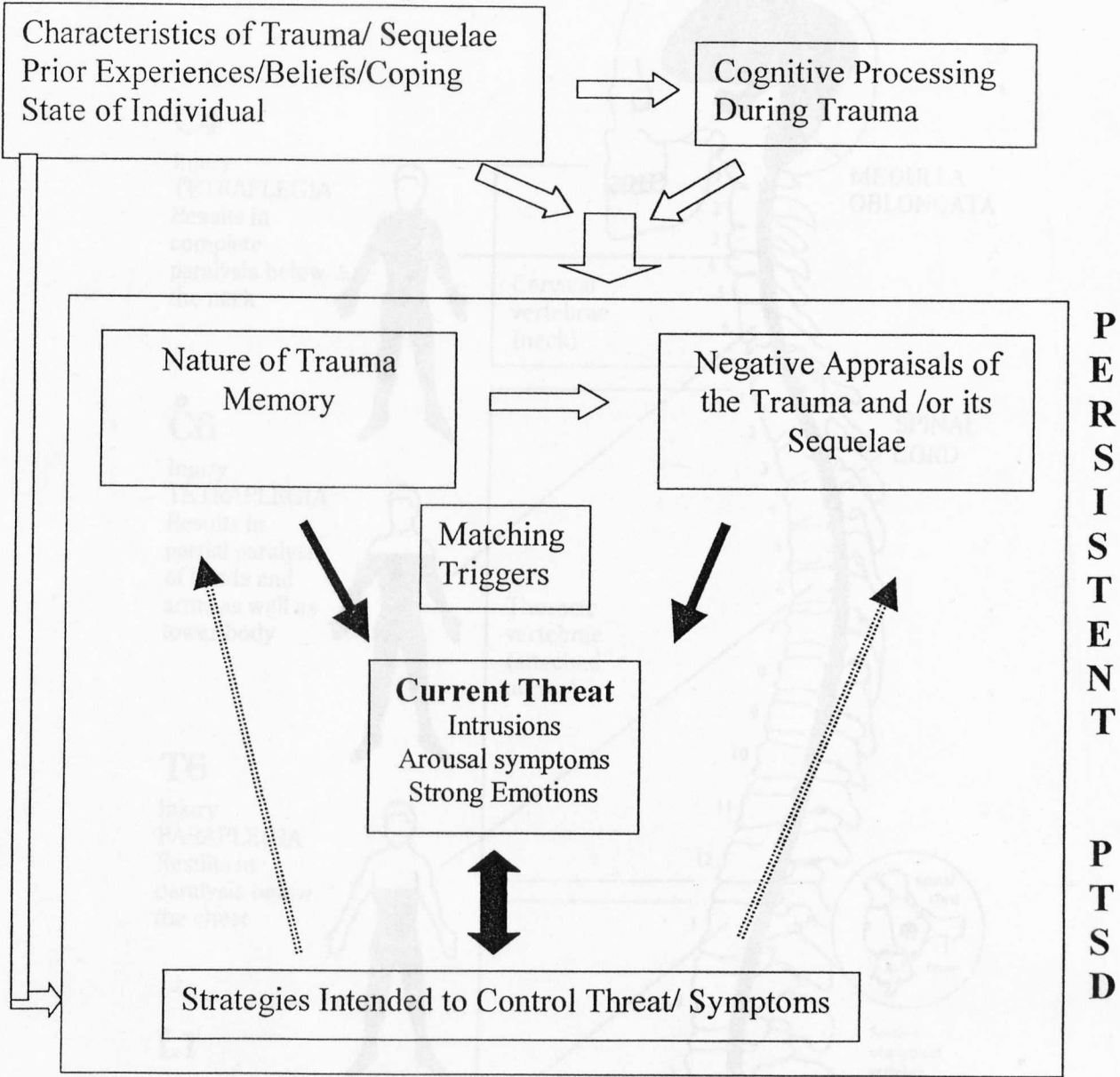
Zigmond,A.S. & Snaith,R.P. (1983). The hospital anxiety and depression scale. Acta Psychiatrica Scandinavica,67,361-70.

Zilberg,N.J., Weiss,D.S. & Horowitz,M. (1983). Impact of Event Scale: A cross-validation study and some empirical evidence supporting a conceptual model of stress response syndromes. Journal of Consulting and Clinical Psychology,50, 3,407-414.

## APPENDICES

- 1 *Cognitive Model of persistent PTSD*
- 2 *Levels of injury on the spinal cord*
- 3 *Short demographics questionnaire*
- 4 *Frankel Classification*
- 5 *Functional Independence Measure (FIM)*
- 6 *Posttraumatic Diagnostic Scale (PDS)*
- 7 *Impact of Event Scale (IES)*
- 8 *Hospital Anxiety and Depression Scale (HADS)*
- 9 *Social Support Questionnaire-Short Form (SSQ6)*
- 10 *Posttraumatic Cognitions Inventory (PTCI)*
- 11 *Ethical Approval Letter*
- 12 *Information sheet*
- 13 *Consent form*
- 14 *Means and Inter-quartile ranges*
- 15 *Table of comparison of participants and non-participants*

Ehlers and Clark (2000) Cognitive Model of persisting PTSD

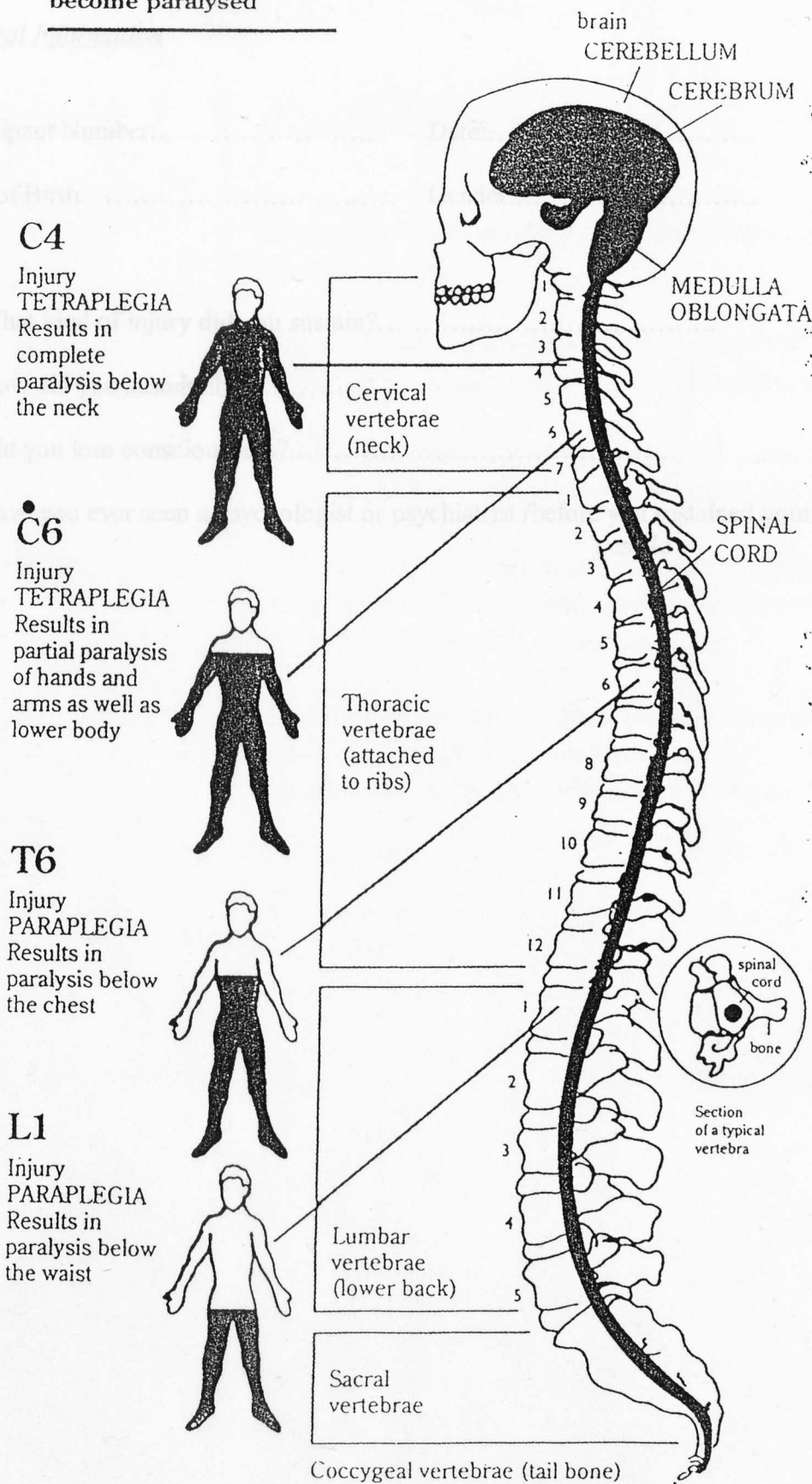


Arrows indicate the following relationships:

- > Leads to
- > Influences
- .....> Prevents change in

Appendix: 2

**The higher the spinal injury, the more muscles become paralysed**





Appendix: 3

General Information

Participant Number:..... Date:.....

Date of Birth:..... Gender:.....

- 1. What kind of injury did you sustain?.....
- 2. How did you sustain it?.....
- 3. Did you lose consciousness?.....
- 4. Have you ever seen a psychologist or psychiatrist /before you sustained your injury?  
Yes/No

## FRANKEL CLASSIFICATION

<i>Frankel Grade</i>	<i>Description of Impairment</i>
<b>A</b>	<b>‘Complete’</b> : no sensory or motor functioning below the injury level
<b>B</b>	<b>‘Sensory only’</b> : some sensation below the injury level but motor paralysis remains complete below that level.
<b>C</b>	<b>‘Motor Useless’</b> : some motor power present below the injury level but is of no practical use to the patient.
<b>D</b>	<b>‘Motor Useful’</b> : useful motor power present below the injury level. Patients can move the lower limbs and many can walk –with or without aids.
<b>E</b>	<b>‘Recovery’</b> : patient is free of neurological <i>symptoms</i> (i.e. no weakness, sensory loss or sphincter disturbance). May have abnormal reflexes.

## Appendix: 5

### ***Functional Independence Measure***

*In this questionnaire, please indicate your level of independence by placing the appropriate number in the box next to each item.*

*7 = you are completely independent*

*6 = modified independence (i.e. use of a device)*

*5 = modified dependence (i.e. requiring supervision)*

*4 = minimal assistance is needed (i.e. can do about 75% yourself)*

*3 = moderate assistance is needed (i.e. can do about 50% yourself)*

*2 = maximal assistance is needed (i.e. can do about 25% yourself)*

*1 = total assistance is needed (i.e. can do about 0% yourself)*

#### **Self care**

- a) Feeding ☐
- b) Grooming ☐
- c) Bathing ☐
- d) Dressing-upper body ☐
- e) Dressing-lower body ☐
- f) Toileting ☐

#### **Sphincter Control**

- g) Bladder management ☐
- h) Bowel management ☐

#### **Mobility**

Transfer:

- i) Bed, chair, wheelchair ☐
- j) Toilet ☐
- k) Tub, shower ☐

#### **Locomotion**

- l) Walk/ wheelchair ☐
- m) Stairs ☐

#### **Communication**

- n) Comprehension ☐
- o) Expression ☐

#### **Social Cognition**

- p) Social interaction ☐
- q) Problem solving ☐
- r) Memory ☐

*Posttraumatic Diagnostic Scale*

1. *Many people have lived through or witnessed a very stressful and traumatic event at some point in their lives. Below is a list of traumatic events. Put a tick in the box next to all the events that have happened to you or that you have witnessed.*

- ☐ Serious accident, fire or explosion (e.g. an industrial, farm, car or boating accident)
- ☐ Natural disaster (e.g. flood or earthquake)
- ☐ Non sexual assault by someone you know (e.g. being mugged)
- ☐ Non sexual assault by a stranger
- ☐ Sexual assault by someone you know (e.g. rape)
- ☐ Sexual assault by a stranger
- ☐ Military combat or war zone
- ☐ Sexual contact when under 18
- ☐ Imprisonment (e.g. hostage, prison inmate)
- ☐ Torture
- ☐ Life –threatening illness
- ☐ Other traumatic event (please specify below)

\_\_\_\_\_

\_\_\_\_\_

*If you ticked more than one of the above, please specify below which event bothers you most.*

\_\_\_\_\_

Please describe this event briefly

\_\_\_\_\_

\_\_\_\_\_

2. *Below are several questions about the traumatic event you just described above.*

*How long ago did the event happen? (circle ONE)*

- 1. 1 to 3 months
- 2. 3 to 6 months
- 3. 6 months to 3 years
- 4. 3 to 5 years
- 5. More than 5 years

*For the following question, circle Y for Yes and N for No.*

*During the traumatic event,*

- Y N Were you physically injured?
- Y N Was someone else physically injured?
- Y N Did you think your life was in danger?
- Y N Did you think someone else’s life was in danger?

Y N Did you feel terrified?

Frequency Scale:

3=5 or more times a week/ almost always

0	1	2	3
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0

*Very distressing*

*How often?*      0   1   2   3      *How distressing has this been?*      0   1   2   3

*How often?*      0   1   2   3      *How distressing has this been?*      0   1   2   3

*How often?*      0   1   2   3      *How distressing has this been?*      0   1   2   3

How often?      0    1    2    3      How distressing has this been?      0    1    2    3

How often?      0    1    2    3      How distressing has this been?      0    1    2    3

How often?      0   1   2   3      How distressing has this been?      0   1   2   3

7. Trying to avoid activities, people or places that remind you of the traumatic event

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

8. Not being able to remember an important part of the traumatic event

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

9. Having much less interest in or participating much less often in important activities

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

10. Feeling distant or cut off from people around you

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

11. Feeling emotionally numb (for example, being unable to cry or unable to have loving feelings)

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

12. Feeling as if your future plans or hopes will not come true (for example you will not have a career, marriage, children or a long life)

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

13. Having trouble falling or staying asleep

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

14. Feeling irritable or having fits of anger

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

15. Having trouble concentrating (for example, drifting in and out of conversations, losing track of a story on television, forgetting what you read)

*How often?*      0 1 2 3      *How distressing has this been?*      0 1 2 3

16. Being overly alert (for example checking to see who is around you, being uncomfortable with your back to a door, etc.)

How often?      0   1   2   3      How distressing has this been?      0   1   2   3

17. Being jumpy or easily startled (for example, when someone walks up behind you)

How often?      0   1   2   3      How distressing has this been?      0   1   2   3

Please indicate HOW MUCH the **problems listed above** (as opposed to your physical problems) have INTERFERED WITH the following areas of your life DURING THE PAST MONTH.

a) WORK  
Because of my problems, my work (rehabilitation progress) is impaired

0   1   2   3   4   5   6   7   8   9   10  
not   mildly   moderately   markedly   very severe  
at all   (cannot work)

b) SOCIAL LIFE/ LEISURE ACTIVITIES  
(With other people socialising, such as people coming to visit you, going on outings, meeting new people)

Because of my problems, my social life is impaired

0   1   2   3   4   5   6   7   8   9   10  
not   mildly   moderately   markedly   very severe  
at all   (I never do these)

c) FAMILY LIFE/ HOME RESPONSIBILITIES  
(Relating to family members, organising domestic arrangements, participating in OT activities)

Because of my problems, my family and home responsibilities are impaired

0   1   2   3   4   5   6   7   8   9   10  
not   mildly   moderately   markedly   very severe  
at all   (I never do these)

*Impact of Event Scale*

*Below is a list of comments made by people after stressful life events. Please tick each item, indicating how frequently these comments were true for you **during the past 7 days**. If they did not occur during that time, please mark the 'not at all' column.*

		FREQUENCY			
		Not at all	Rarely	Sometimes	Often
1.	I thought about it when I didn't mean to				
2.	I avoided letting myself get upset when I thought about it or was reminded of it				
3.	I tried to remove it from memory				
4.	I had trouble falling asleep or staying asleep because of the pictures or thoughts about it that came into my mind.				
5.	I had waves of strong feelings about it				
6.	I had dreams about it				
7.	I stayed away from reminders of it				
8.	I felt as if it hadn't happened or it wasn't real				
9.	I tried not to talk about it				
10.	Pictures about it popped into my mind				
11.	Other things kept making me think about it				
12.	I was aware that I still had a lot of feelings about it but I didn't deal with them				
13.	I tried not to think about it				
14.	Any reminder brought back feelings about it				
15.	My feelings about it were kind of numb				



## Appendix: 8

### *Hospital Anxiety and Depression Scale*

*Read each item below and underline the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.*

**I feel tense or 'wound up'**

Most of the time  
A lot of the time  
From time to time, occasionally  
Not at all

**I still enjoy the things I used to enjoy**

Definitely as much  
Not quite so much  
Only a little  
Hardly at all

**I get a sort of frightened feeling  
as if something awful is about to happen**

Very definitely and quite badly  
Yes but not too badly  
A little but it doesn't worry me  
Not at all

**I can laugh and see the funny side of things**

As much as I always could  
Not quite as much now  
Definitely not so much now  
Not at all

**Worrying thoughts go through my mind**

A great deal of the time  
A lot of the time  
Not too often  
Very little

**I feel cheerful**

Never  
Not often  
Sometimes  
Most of the time

**I can sit at ease and feel relaxed**

Definitely  
Usually  
Not often  
Not at all

**I feel as if I am slowed down**

Nearly all the time  
Very often  
Sometimes  
Not at all

**I get a sort of frightened feeling  
like butterflies in the stomach**

Not at all  
Occasionally  
Quite often  
Very Often

**I have lost interest in my  
appearance**

Definitely  
I don't take as much care as I should  
I may not take quite as much care  
I take as much care as ever

**I feel restless as if I have to be on the  
move**

Very much indeed  
Quite a lot  
Not very much  
Not at all

**I look forward with enjoyment to  
things**

As much as I ever did  
Rather less than I used to  
Definitely less than I used to  
Hardly at all

**I get sudden feelings of panic**

Very often indeed  
Quite often  
Not very often  
Not at all

**I can enjoy a good book or television  
programme**

Often  
Sometimes  
Not often  
Very seldom

### Short Form Social Support Questionnaire

*The following questions ask you about people in your environment who provide you with help or support. Each question has two parts. For the first part, list all the people you know, excluding yourself, whom you can count on for help and support in the manner described. Give each person's initials and their relationship to you (see example). Do not list more than 1 person next to each of the numbers beneath each question. Do not list more than 9 people per question.*

*For the second part, using the scale below, circle how satisfied you are with the overall support you have.*

6	5	4	3	2	1
Very satisfied	Fairly satisfied	A little satisfied	A little dissatisfied	Fairly dissatisfied	Very dissatisfied

*If you have no support for a question, tick 'no one', but still rate your level of satisfaction. The example below has been completed to help you.*

### Example

Who do you know whom you can trust with information that could get you into trouble?

- a) No one                      3) *PN* (father)                      6)                      9)  
    1) *TM* (brother)                      4) *RT* (employer)                      7)  
    2) *LM* (friend)                      5)                      8)

b) How satisfied?    6      5      4      3      2      1  
(Circle as appropriate)

1. Who can you really count on to distract you from your worries when you feel under stress?

- |           |    |    |    |
|-----------|----|----|----|
| a) No one | 3) | 6) | 9) |
| 1)        | 4) | 7) |    |
| 2)        | 5) | 8) |    |

b) How satisfied?    6      5      4      3      2      1  
(Circle as appropriate)

**2. Who can you really count on to help you feel more relaxed when you are under pressure or tense?**

a) No one	3)	6)	9)
1)	4)	7)	
2)	5)	8)	

b) How satisfied? 6 5 4 3 2 1  
(Circle as appropriate)

**3. Who accepts you totally including both your worst and best points?**

a) No one	3)	6)	9)
1)	4)	7)	
2)	5)	8)	

b) How satisfied? 6 5 4 3 2 1  
(Circle as appropriate)

**4. Who can you really count on to care about you regardless of what is happening to you?**

a) No one	3)	6)	9)
1)	4)	7)	
2)	5)	8)	

b) How satisfied? 6 5 4 3 2 1  
(Circle as appropriate)

**5. Who can you really count on to make you feel better when you are feeling generally down- in- the- dumps?**

a) No one	3)	6)	9)
1)	4)	7)	
2)	5)	8)	

b) How satisfied? 6 5 4 3 2 1  
(Circle as appropriate)

**6. Who can you count on to console you when you are very upset?**

a) No one	3)	6)	9)
1)	4)	7)	
2)	5)	8)	

b) How satisfied? 6 5 4 3 2 1  
(Circle as appropriate)

---

*The Posttraumatic Cognitions Inventory*

*This questionnaire lists different thoughts which people may have after a traumatic experience. In this questionnaire we are interested in the way you thought, IN THE LAST MONTH, in regard to the traumatic event you experienced.*

*Please read each statement carefully and, using the following scale, decide how much you AGREED or DISAGREED with each statement during the last month. People react in many different ways. There are no right or wrong answers to these statements.*

1	2	3	4	5	6	7
Totally Disagree	Disagree Very Much	Disagree Slightly	Neutral	Agree Slightly	Agree Very Much	Totally Agree

- 1.

The event happened to me because of the way I acted
- 2.

I can't trust that I will do the right thing
- 3.

I am a weak person
- 4.

I will not be able to control my anger and will do something terrible
- 5.

I can't deal with even the slightest upset
- 6.

I used to be a happy person but now I am always miserable
- 7.

People can't be trusted
- 8.

I have to be on guard all the time
- 9.

I feel dead inside
- 10.

You can never know who will harm you
- 11.

I have to be especially careful because you never know what can happen next
- 12.

I am inadequate
- 13.

If I think about the event, I will not be able to handle it
- 14.

The event happened to me because of the sort of person I am
- 15.

My reactions since the event mean that I am going crazy
- 16.

I will never be able to feel normal emotions again
- 17.

The world is a dangerous place
- 18.

Somebody else would have stopped the event from happening
- 19.

I have permanently changed for the worse
- 20.

I feel like an object, not a person
- 21.

Somebody else would have not have gotten into this situation
- 22.

I can't rely on other people
- 23.

I feel isolated and set apart from others
- 24.

I have no future
- 25.

I can't stop bad things from happening to me
- 26.

People are not what they seem
- 27.

My life has been destroyed by the trauma
- 28.

There is something wrong with me as a person
- 29.

My reactions since the event show that I am a lousy copier
- 30.

There is something about me that made the event happen
- 31.

I feel like I don't know myself anymore
- 32.

I can't rely on myself
- 33.

Nothing good can happen to me anymore

Aylesbury Vale Local Research Ethics Committee

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E-mail: Peter.Mansfield@smh.nhs.uk

8<sup>th</sup> August 2001

Miss E Agar  
Clinical Psychologist in Training  
Isis Education Centre  
Warneford Lane  
Oxford OX3 7JX

Dear Miss Agar,

Re: NC1065 - Predictors of persisting symptoms of post-traumatic stress disorder (PTSD) in people who have sustained traumatic physical injuries

I refer to your application to the Local Research Ethics Committee for consideration of the above project. I am pleased to inform you that the Committee approves the project on ethical grounds on the understanding that:

- i. Any ethical problem, arising in the course of the project, will be reported to the Committee.
- ii. Any change in the protocol will be reported to the Committee.
- iii. The Data Protection Act 1998 be adhered to.
- iv. There is compliance, throughout the conduct of the study, with good clinical research practice.
- v. The Committee be informed if the research is discontinued for any reason.
- vi. A report be submitted after completion.
- vii. Ethical approval is for three years from the date of this letter

Ethical approval by the Committee is not an authority to proceed. You are advised to discuss your proposal with all heads of departments and others who might be affected, particularly if there are financial and/or staffing implications.

## Appendix: 11

Please note that your research will be subject to review annually by the Committee.

Yours sincerely

A handwritten signature in black ink, appearing to read 'P. Mansfield', written over a horizontal line.

**PETER MANSFIELD**

Secretary to Local Research Ethics Committee

Copy to: Chief Executive, Stoke Mandeville Hospital  
R&D Office, Stoke Mandeville Hospital  
Dr P Kennedy, NSIC, Stoke Mandeville Hospital

### ***Invitation letter and information sheet***

Dear

You are invited to participate in a study looking at stress symptoms that people sometimes experience following a sudden event in which they have been injured.

I am Ellie Agar, a trainee clinical psychologist, working with Dr Paul Kennedy and Dr Nigel King, Consultant Clinical Psychologists. We are interested in investigating what makes stress symptoms that sometimes occur following a sudden event persist in people who have been injured during the event.

#### **What is the research about?**

The study aims to find out whether the kinds of thoughts people have about the event lead to more distress over time than other aspects of their situation such as the severity of their physical injury. The study will be valuable in advancing our understanding of distress following sudden physical injury and as a result will help improve the design of psychological therapies to best help people who suffer long standing distress following a sudden physical injury.

We are interested in talking to people who have sustained traumatic injuries whether they are currently distressed or not.

#### **What does it involve?**

If you decide that you would like to participate, we will arrange a time to meet in a quiet room off the ward. Participation involves completing several short questionnaires about stress symptoms, the severity of your injuries and your thoughts about the injuries and the event that caused them. This would take approximately 20-40 minutes. You will not be asked to discuss any of your responses in detail but I will be available to answer any questions or help you complete the forms if necessary.

#### **How will confidentiality be maintained?**

All information you provide during the course of this research will be kept strictly confidential. Your name will not be recorded on any of the questionnaires. The data will be reported as group data so it will be impossible to identify individuals.

You may or may not choose to participate in this research. Your choice will not affect the services provided to you. If you choose to participate, you are free to withdraw from this study at any point. You do not have to give a reason.

#### **If I have any questions or concerns, whom should I contact?**

If you have any questions or would like further information, please do not hesitate to contact Ellie Agar on 01865 226431. If at any point you feel distressed and would like to talk to a clinical psychologist, please contact Dr Jane Duff, Clinical Psychologist on 5825 (internal line) who will arrange a time to discuss your concerns.

**THANK YOU VERY MUCH FOR YOUR TIME**

**INFORMED CONSENT FORM**

**Working Title of Project:**

Persisting symptoms of distress in people who have sustained traumatic spinal cord injuries.

**Names of Principal Investigators:**

Ellie Agar, Clinical Psychologist in Training  
Dr Nigel King, Consultant Clinical Psychologist  
Dr Paul Kennedy, Consultant Clinical Psychologist

Address for all 3: Oxford Doctoral Course in Clinical Psychology, Isis Education Centre, Warneford Hospital, Oxford, OX3 7JX. Telephone: 01865 226431.

**PLEASE TICK THE BOXES TO CONFIRM THESE STATEMENTS**

I have read the information sheet and have had the opportunity to ask questions ☐

I have received enough information about this study ☐

I understand that relevant sections of my medical notes from Stoke Mandeville may be looked at by the researchers to determine the severity of my injury. I give permission for the researchers to have access to my notes ☐

I understand that I am free to leave the study at any time, without giving a reason for leaving and that my choice does not affect the services I receive ☐

I freely consent to participate in this study ☐

Signature .....

Date .....

Name (in block letters) .....

Researcher: Signature.....  
Date.....



*Medians and inter-quartile ranges for sample characteristics*

	Median	Inter-quartile ranges		
		25 <sup>th</sup>	-	75 <sup>th</sup>
<b>Disability severity</b>	77.00	55.75		107.75
<i>PTS symptoms</i>	10.00	2.50		26.00
<b>Anxiety</b>	6.00	4.00		9.00
<b>Depression</b>	5.00	3.00		9.00
<b>Social support</b>				
Number	17.00	10.00		24.00
Satisfaction	36.00	31.00		36.00
<i>Cognitions</i>				
Total	72.00	54.00		99.00
Negative cognitions about the self	1.87	1.29		1.86
Negative cognitions about the world	2.64	2.14		3.78
Self-blame	2.00	1.00		3.70

*Comparison of participants and non-participants*

	Participants		Non-participants	
	N (50)	%	N (12)	%
<b>Gender:</b>				
Men	43	(86.0)	8	(66.6)
Women	7	(14.0 %)	4	(33.3)
<b>Cause of Injury:</b>				
RTA	25	(50.0)	9	(75.0)
Fall	10	(20.0)	2	(16.7)
Sport	13	(26.0)	1	(8.3)
Other	2	(4.0)	0	(0.0)
<b>Level of Injury:</b>				
Tetraplegia	30	(60.0)	6	(50.0)
Paraplegia	20	(40.0)	6	(50.0)
<b>Complete/ Incomplete:</b>				
Complete	34	(68.0)	8	(66.7)
Incomplete	16	(32.0)	4	(33.3)
<b>Impairment Severity Rating:</b>				
C1 to C4	8	(16.0)	0	(0.0)
C5 to C7	17	(34.0)	3	(25.0)
C8 to T7	9	(18.0)	3	(25.0)
T8 to T12	8	(16.0)	3	(25.0)
L1 and below	3	(6.0)	2	(16.7)
Frankel Grades D & E	5	(10.0)	1	(8.3)
<b>Age (years)</b>				
Mean (SD)	38.9 (13.42)		35.1 (6.72)*	
Range	20.1-65.1		26.0-48.0	
*Age of non-participants excludes 2 because they were outside the age inclusion criteria.				

Mann Whitney U (MWU) test results:

- Age: t-test not possible because equal variance assumptions were unmet. MWU test (U= 226.000,  $p=.634$ ).
- Impairment severity: (ordinal so could not use a t-test): MWU (U=213.500,  $p=.114$ ) n.s.

Chi square test results:

- Gender:  $\chi^2$  did not meet assumptions so Fisher's Exact:  $p=.126$  n.s.
- Completeness:  $\chi^2$  did not meet assumptions so Fisher's Exact:  $p=.591$  n.s.
- Paraplegia/tetraplegia (level):  $\chi^2$  (1) .397,  $p=.528$  n.s.